SPITHEAD

THE NAVY'S ANVIL

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The Navy's Anvil

By

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Amongst the topics dealt with in the earlier pages of this book are the growth of fortifications. To aid those who visit the area the following index by topics is included rather than a formal list of contents.

SPITHEAD

The Navy's Anvil

PREFACE

Spithead is a stretch of water from which fleets have sailed in the prosecution of war, furtherance of trade or search for knowledge. These undertakings involved risks and often provoked retaliation. Around this water towns grew up providing the shipwrights, crews and traders and thereby forming the target for assault. This is an account of cause and effect which shows, through the growth of fortifications for the harbour and dockyard at Portsmouth and the waters of the Solent and Spithead, how these islands have lived through a thousand years with invasion fears alive in the memory of every generation. Sometimes ships at or from Spithead dominated the policies of nations whilst on other occasions the absence of sufficient well found ships caused real fear in Britain whilst always there was a need for a safe fleet refuge. The changes in ships from sail to steam and from wood to steel, with the consequent changes in artillery, all combined to produce problems for those who brought their skills together to forge the great weapon of sea power around this warship anchorage and to defend its roadsteads and installations. This account explains their problems and relates them to the fortifications of the area which remain.

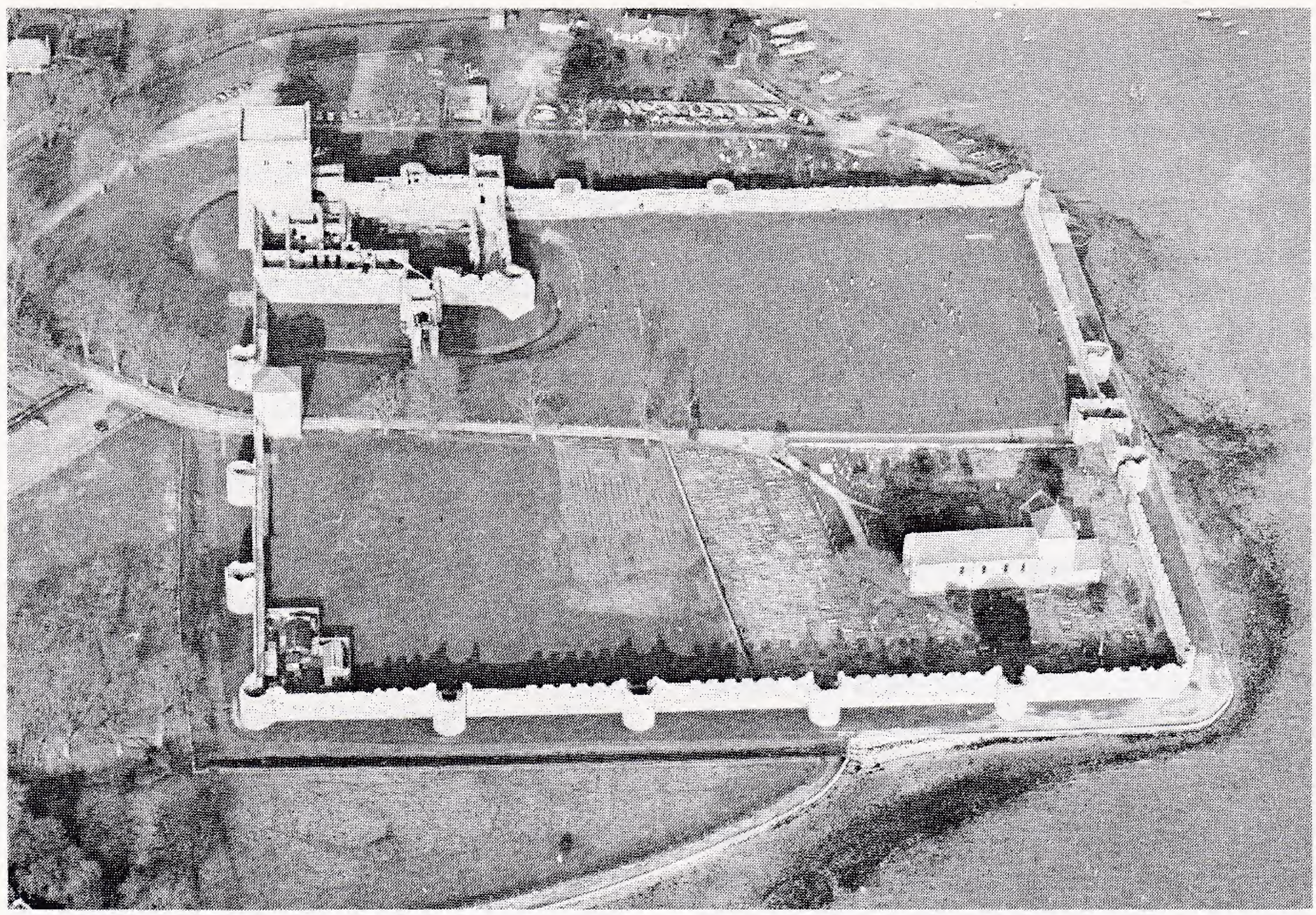
Every Royal review brings a different assortment of ships to Spithead but although old ships and old designs give way to new, two aspects never change. The fire power and destructive force is greater than before and the ships anchor in safety protected from the worst of the elements by the surrounding country and from battle injury by the fact that we are at peace. Spare a thought however for earlier times when either war or unsettled peace created the need for this safe haven and made it necessary to defend the Solent with strong forts; forts which even a hundred years after being completed are still standing and even more able to withstand atomic attack than any other visible military work built in the area since.

Let us look at the area from early times until the era of "Fortress Portsmouth" when over 623 guns provided protection to the waters from the Needles to Spithead, and let history show how the need for a safe haven arose and how the area passed in importance through the levels of local, royal, national and imperial needs. As we follow the story of the dozens of raids, landings and invasions of our country that there have been, a score or more since William the Conquerer carried out the "last" invasion, we will see how they gave meaning to the fortifications which remain although the events have themselves slipped from memory.

THE ROMAN PERIOD

Our story begins in the third century A.D. when Roman ships sailed to the upper reaches of Portsmouth harbour where a great fort was to be built. For with the placing of the first stones for Portchester Castle the ingredients of a story of 1500 years to come were brought together. Their need was for a beaching point for their craft in a place safe from storms where an invader's attack was unlikely to achieve surprise and a physical means of protection for life and property could be created. On such a spot they built this "Fort of the Saxon Shore" where their vast construction was protected behind by the mass of Portsdown Hill whilst the approach from the Solent stood three miles away across mud flats and twisting channels. We do not know if the Romans occupied the site by force, although early evidence of violent death exists, but fear often stalked the harbours and inlets of the Solent during the centuries after the first Roman bastion was completed and felt the measured tread of a sentry's feet and before any further defensive works were erected. This fear arose because whilst some men were content to have what crops they grew or animals they reared; and whilst food, shelter and the warmth of home spun clothes were sufficient buffers against the vagaries of life, some gained more than the barest essentials of life and had wealth. One man's wealth is another man's plunder and during a period of many hundreds of years the Solent saw much purging by fire and sword which touched Portsmouth, Southampton, Newtown in the Isle of Wight and other places. Sometimes it was the Danes who pillaged, raped and took spoils and they even wintered on the south coast but William of Normandy in 1066 showed that the greatest profit was taken by a long stay and his conquest of the country showed what could be achieved by a well trained cohesive force placed strategically on shore against an under strength army of tired men.

William's accession saw the beginning of Portsmouth and the Solent as places from which armies sailed instead of being only the passive sufferers of force. The town nestled in the south west corner of Portsea Island and near the harbour's mouth. With its deep water quay it had by then become the focal point of the harbour rather than Portchester Castle and the embarkation point for Normandy with the drier stretches of Portsea Island allowing armies to camp.



Portchester Castle, enclosing nearly 9 acres, with the additional Norman Castle in the top left corner.
BY COURTESY OF THE NEWS, PORTSMOUTH

The wealth which trade and usefulness to the King brought was however unprotected and this omission brought its own troubles. From Magna Carta in 1215 through two hundred years which saw our victories in France at Crécy, Poitiers and Agincourt; misery, pain and death was felt through settlements of the Solent at least seven times and men stood to arms against expected attacks on thirteen other occasions. Portsmouth's share was to be attacked in 1338, 1369, 1377 and in 1380 and it appeared to be the favourite target.

Victory abroad is not sufficient if the enemy controls your own doorstep and local superiority in the Solent had permitted access to Southampton, an important trading port and source of revenue for the King and for ships and men in the fighting in Scotland and France; and access to Portsmouth from where troops had mustered and embarked for Gascony and other places many times; when after fifty particular troubled years Richard II ordered a survey of both towns' defensive needs in 1386. Long and hard must the discussions have been on what was desirable and what could be afforded, protection always being costly. However the following year the imminent threat of invasion confined ships to their harbours around the Solent and gave impetus to the survey's recommendations.

The survey had involved the King as head of state and government directly in the affairs of the two towns and thereby in the Solent as the key to both. For this reason alone it would have marked a stage in the story but there is also one other factor. From this time on Southampton's path was more towards trade whereas Portsmouth's direction was to a naval and military future and in considering the growth of the fortifications their importance soon becomes specific to Portsmouth as a military town and to the military importance of the Solent rather than as just a means of

protecting property and life in general. It is in this context that this account continues.

In considering the military importance of Portsmouth the survey found a town close to a very narrow harbour mouth. If the harbour mouth could be protected enemy ships might either be prevented from entering or if they could not be stopped they could probably be prevented from towing out prizes. On the landward side was some marsh; if the small town could be surrounded by a defensive line, strengthened naturally by the wet ground, successful attack through the back way was less likely. So the general principles followed ever since were laid down, protect the entrance, protect the rear, make good use of wet ground and water.

It is probable that after the 1386 survey the town was enclosed by a simple earthwork. The beginning of more durable defences followed in 1418 with a round tower on the Portsmouth side of the harbour and about the same time with another on the Gosport side and at various times thereafter a chain or boom was put across the harbour mouth. The front was thereby protected. In 1494 the square tower was built to increase the strength of this protection by extending the area of sea approaches to the harbour mouth covered by Portsmouth's artillery and on the Gosport side similar provision was apparently made by the creation of a blockhouse.

Fortifications from the 15th-19th Century Round Tower, Square Tower, 18 Gun Battery, Hot Walls, Long Curtain, Kings Bastion, Southsea Castle and Lumps Fort. Plus the Church/ Cathedral damaged in the Civil War and the Sea Forts. *(Map page 24)*

AEROFILMS PHOTO

This photograph covers almost all ground included within the Gosport Area Fortifications. From the two Tower Blocks right to the Storage Tanks is approximately the "Town" fortified area. The coastline heads from Blockhouse to Monckton. Gilkicker and round to Stokes Bay and Browndown. AEROFILMS PHOTO

HENRY VIII

The threat of a Franco/Spanish invasion following Henry VIII's breach with the Pope made him embark on a series of castles to protect the Solent and all the approaches to Portsmouth where he, the generally accepted creator of the first permanent Royal Navy, had started that navy by laying down the Mary Rose and the Peter Pomegranate. He built his works at Hurst, East Cowes, West Cowes, Calshott, Southsea, Sandown and Hasleworth giving each of the important areas of the Solent a defensive strong point whilst at Portsmouth and Gosport the artillery coverage now extended over a far greater area of water approaches to the harbour mouth. On the landward side the town defences were also improved but barely finished when in 1545 the need for them was reinforced by a French attack off Ryde, a landing party on the Isle of Wight for three days and the loss of the Mary Rose with its important battery and counter battery artillery. The defences of Portsmouth town with their six cannons and fifty two other pieces were not however subjected

This view looks eastward from Southsea Castle and shows Lumps Fort, Eastney Fort West, Eastney Fort East and Fort Cumberland. Note the width and nature of the Beaches. *AEROFILMS PHOTO*

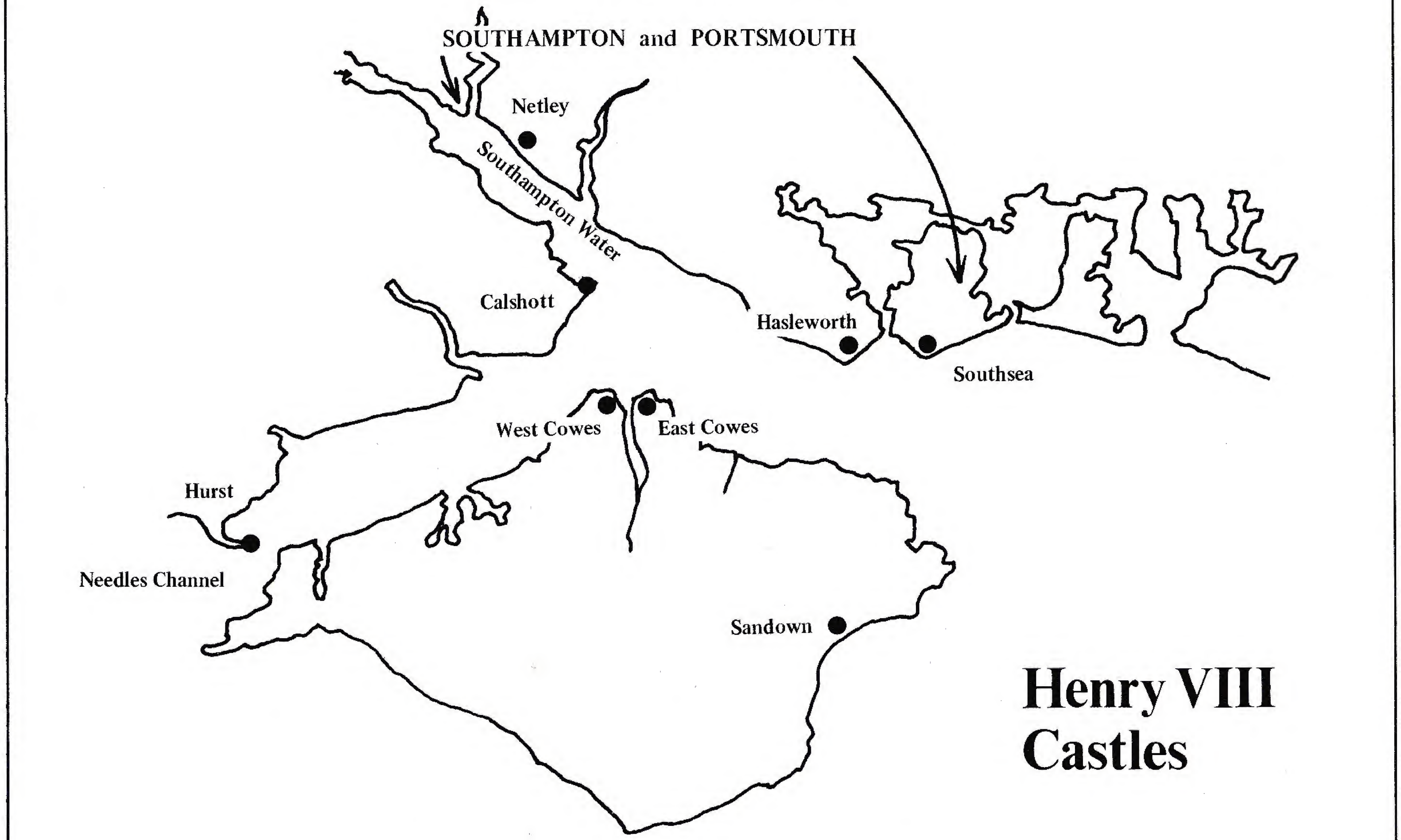
to attack, their very presence had deterred the enemy. The treaty of Ardres the following year, 1546, began a typical period of uneasy peace for the area enlivened only by Mary Tudor's marriage to Philip of Spain at Winchester and Southampton's acquisition of a monopoly in the sweet wine trade. There was the usual procession of people inspecting and criticising the defences of Portsmouth, new schemes for the town's defences were prepared and worked on intermitently, but no co-ordinated plan for the whole area emerged in case war came again.

THE SPANISH ARMADA 1588

The outbreak of open war with Spain led as usual to the clearing and repairing of town ditches, renewed talk of invasion, great efforts to recruit yeomen for home defence and the usual searches for scapegoats over the oft found deficiencies Portsmouth in 1588, like other towns, waited and whilst men throughout the country stood on windy hill tops ready to light warning beacons the Armada of Spain bore down the channel. Knuckles

This view shows the funnel of water leading to the Harbour Mouth. Note Southsea Castle and Fort Gilkicker at the top of the arms, also Fort Monckton and Stokes Bay on the Gosport side and Hilsea Lines in the top left corner.
AEROFILMS PHOTO

gleamed white on many a pike as this force proved its ability to penetrate the channel but how low would spirits around Portsmouth and the Isle of Wight have been had men realised that this force which had set out with over one hundred and twenty three thousand round shot and half a million pounds of powder in its holds was approaching the Isle of Wight with ample stores of powder and ammunition left and the holds of such as the Trinidad Valencera's crammed with siege artillery while Howard in his ships could only say "much of our ammunition has been spent". Medina Sidonia's army did not come ashore at Stokes Bay and with the passing of his sails the four master gunners and forty gunners who made up the total force of professionals at Portsmouth, Sandown, Calshott and Hurst could rest again whilst an equally pitiful number stood to arms further along the coast and whilst the Spanish army of the Netherlands stood twenty five thousand strong in embarkation ports east from Dunkirk. All ended well however, we were not invaded but Spain profited by defeat and we learnt little by


SOUTHAMPTON and PORTSMOUTH
Netley
Southampton Water
Calshott
Hasleworth
Southsea
West Cowes
East Cowes
Hurst
Needles Channel
Sandown
Henry VIII
Castles

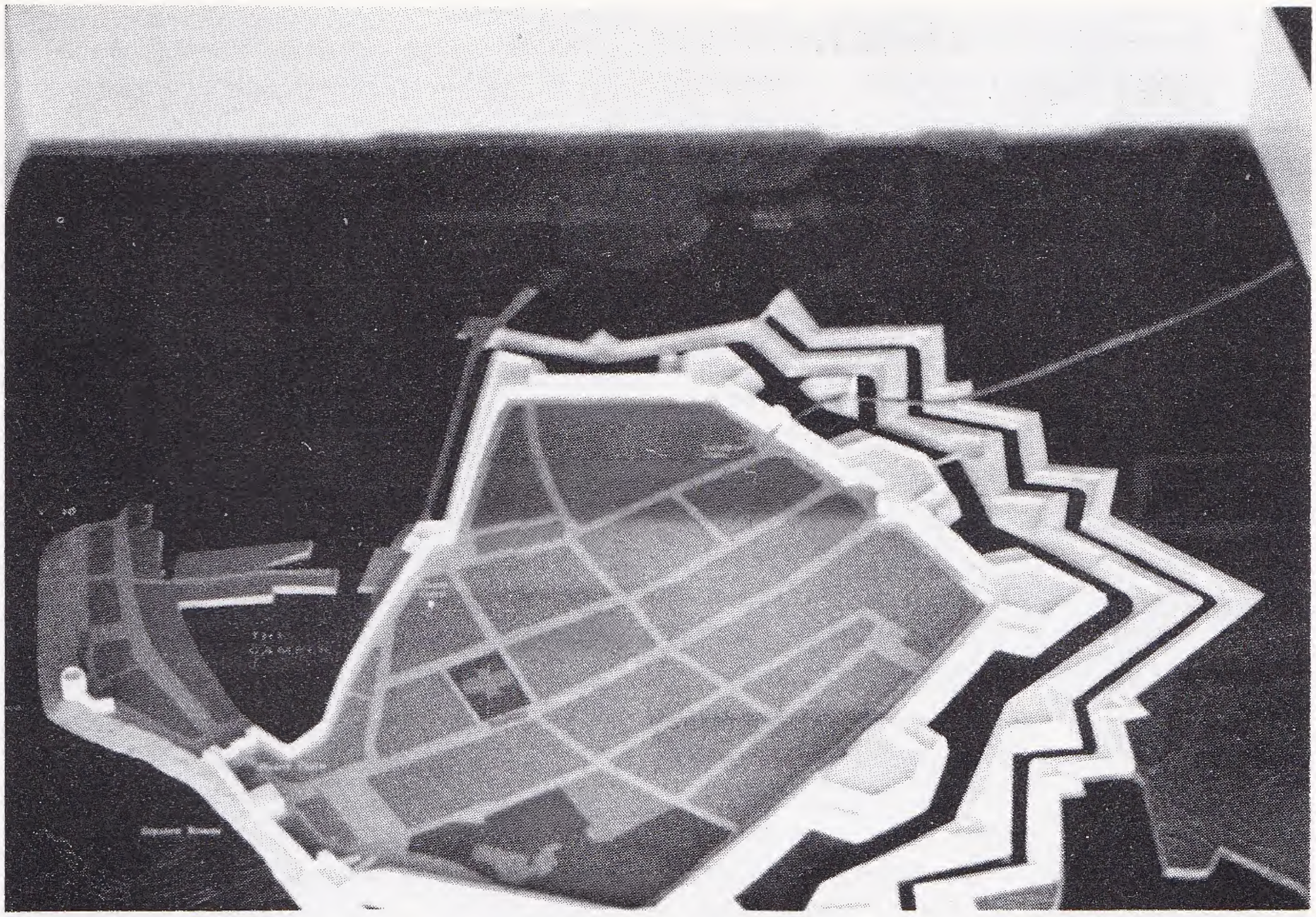
victory other than Drake's great concept and so we were no more ready in 1592 or 1596 when there were renewed fears of attack.

THE CIVIL WARS 1642-1651

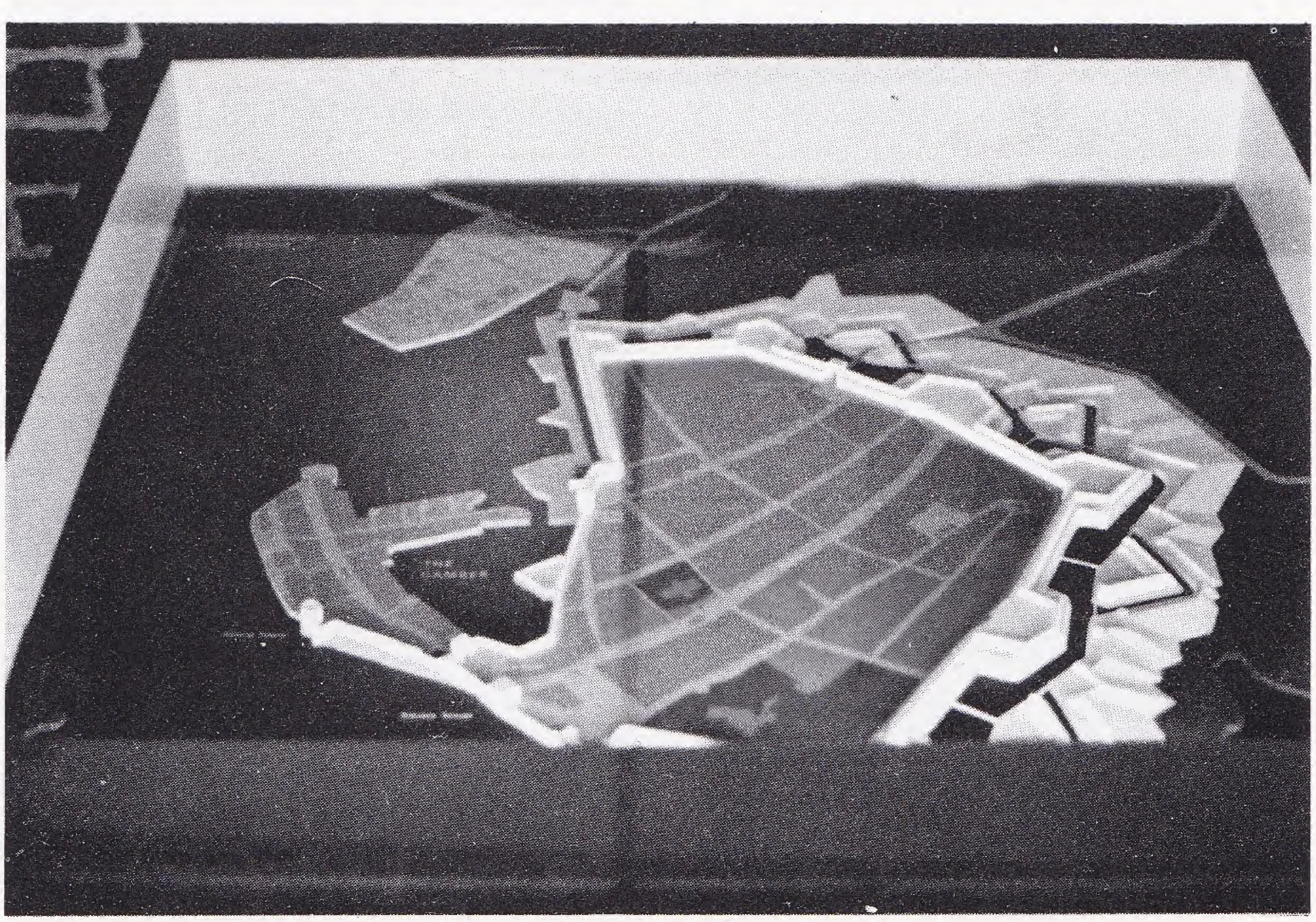
During the nine bloody and painful years from 1642 to 1651 which covered the three clearly divided civil wars between King and parliament some important factors concerning defensive strategy were shown at work in Portsmouth. When George Goring, governor of Portsmouth declared for the King he isolated his own command. Local gentry taking the fort at Portsbridge sealed off the rear and hostile ships in the Solent stopped seaborn assistance but the affect of no unified command over both Portsmouth and Gosport meant that the governor could not carry Gosport with him. This placed the defences of one side of an important harbour against the positions on the other side which normally supported them. When parliament bloodlessly took Southsea Castle on September 3rd, 1642, Goring's isolation was stark but the roar of cannon from a newly constructed parliamentry battery at Gosport, with the whistle of its shot and the whine of flesh tearing splinters dislodged from the stonework of St. Thomas' Church, was necessary before capitulation came. How different might the story have been had Goring controlled both sides of the harbour.

Southsea Castle – Note 19th Century Gun positions landscaped on the right, these and others to the left were spread out – compare Point Battery. (page 18)

AEROFILMS PHOTO



The Portsmouth Defences Circa 1670 when the effect of De Gomme's work has been to give defence in depth by the two moats and associated inter-moat works instead of Henry VIII's single narrow moat.



The Portsmouth Defences Circa 1750 with the town enclosed and protected by a single but wider moat. (From models at Southsea Castle).

THE RESTORATION OF CHARLES II

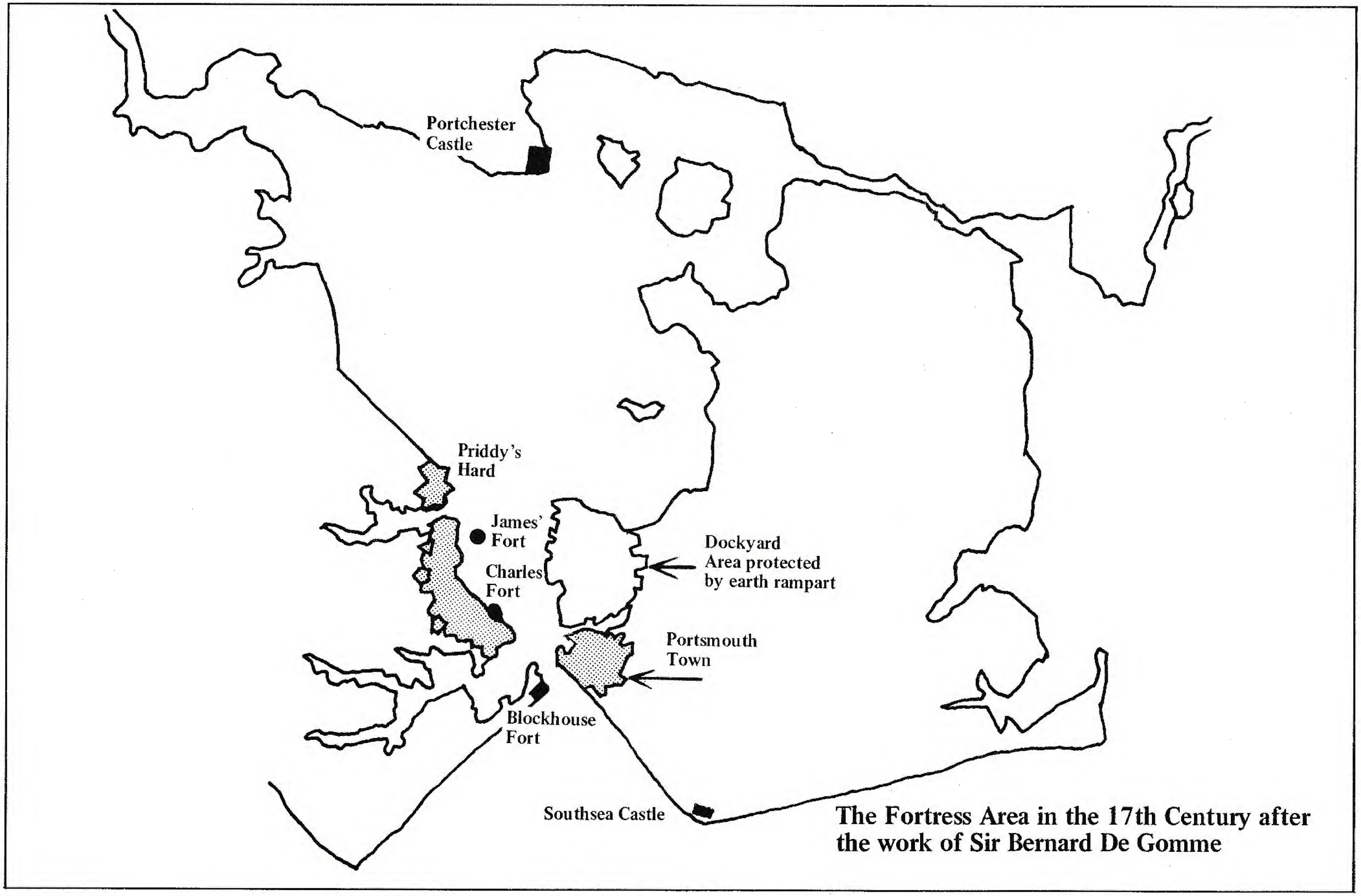
Charles II was a man who could lay claim to many unusual and interesting incidents in his life. He had bargained for his father's life and lost, invaded England via Scotland, been beaten by Cromwell and escaped to live abroad and then negotiate his return to England, the latter in 1661. Once on the throne he took New Amsterdam (New York) from the Dutch, got Tangier and Bombay from Portugal, kept Jamaica which had been Spanish and sold the French Dunkirk. Portsmouth claimed his attentions as host to his betrothed Catherine of Braganza and the attentions of his Engineer-in-Chief in England and Wales Sir Bernard de Gomme who in 1665, the year of official war operations against the Dutch, commenced a major programme to reform the Portsmouth defences which was to take up a period of more than twenty years. Earlier schemes had aimed at protecting the front and direct sea approaches, then throwing a defensive ring around the two harbour towns and finally Henry VIII's strong works of position had been built throughout the Solent. De Gomme now sought to keep an enemy on land further from the town by making the immediate defences deeper without increasing greatly their perimeter length. He also created further links between Portsmouth and Gosport by building forts Charles and James in Portsmouth harbour. The front approaches were strengthened by a new blockhouse battery on the Gosport side and the addition of the eighteen gun battery on the Portsmouth side of the harbour approaches. The dockyard which was outside the town's walls was protected by a simple earth rampart.

DE RUYTERS ATTACK 1667

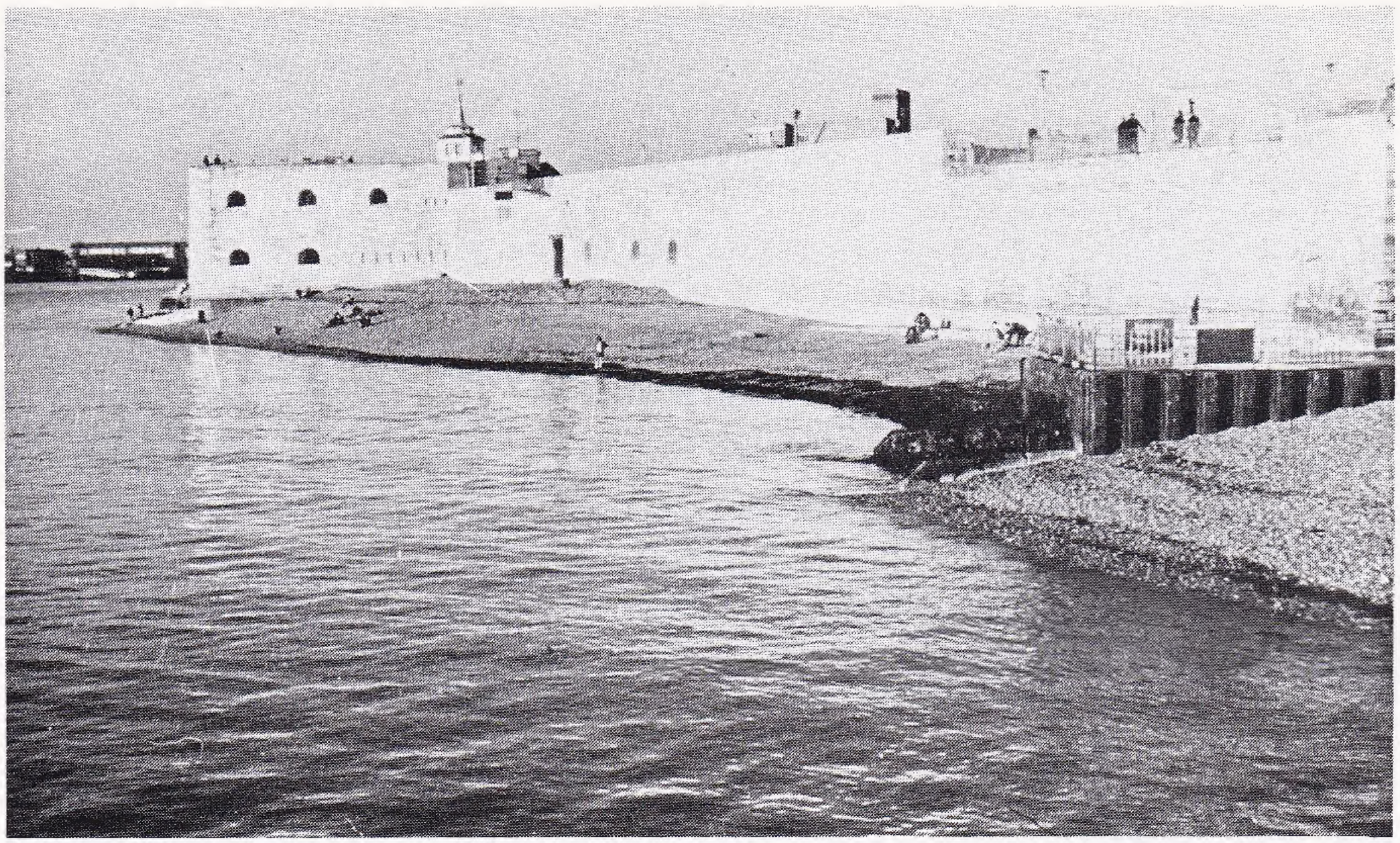
There were three great wars against the Dutch, 1652 to 1654. 1664 to 1667 and 1672 to 1674. Defeat in the first cost them dearly; during the second they lost the naval battle of Lowestoft but succeeded, in 1666, in blockading the Thames for about seven weeks whilst operating off the Essex coast. Then they suffered another defeat and a counter blow on their own coast where one hundred and sixty merchantmen were burnt in the Vlie channel. In 1667 however the peace treaty saw the hated Navigation Act amended in their favour because of an attack by Admiral de Ruyter who struck at the Thames that June and overcoming forts, boom and batteries on the Medway channel took complete control from Chatham to Rochester for three days and occupied English soil for eleven. Although his later attack at Harwich, when he landed twelve hundred men and two guns to take Languard fort on the 1st July, was repulsed he had proved the point that defences only buy time and bargaining power and that if they are too weak they buy nothing but the need to compromise. Fortunately Portsmouth was never considered weak enough to be attacked during these wars although a Dutch fleet came near to it.

MONMOUTH'S REBELLION 1685

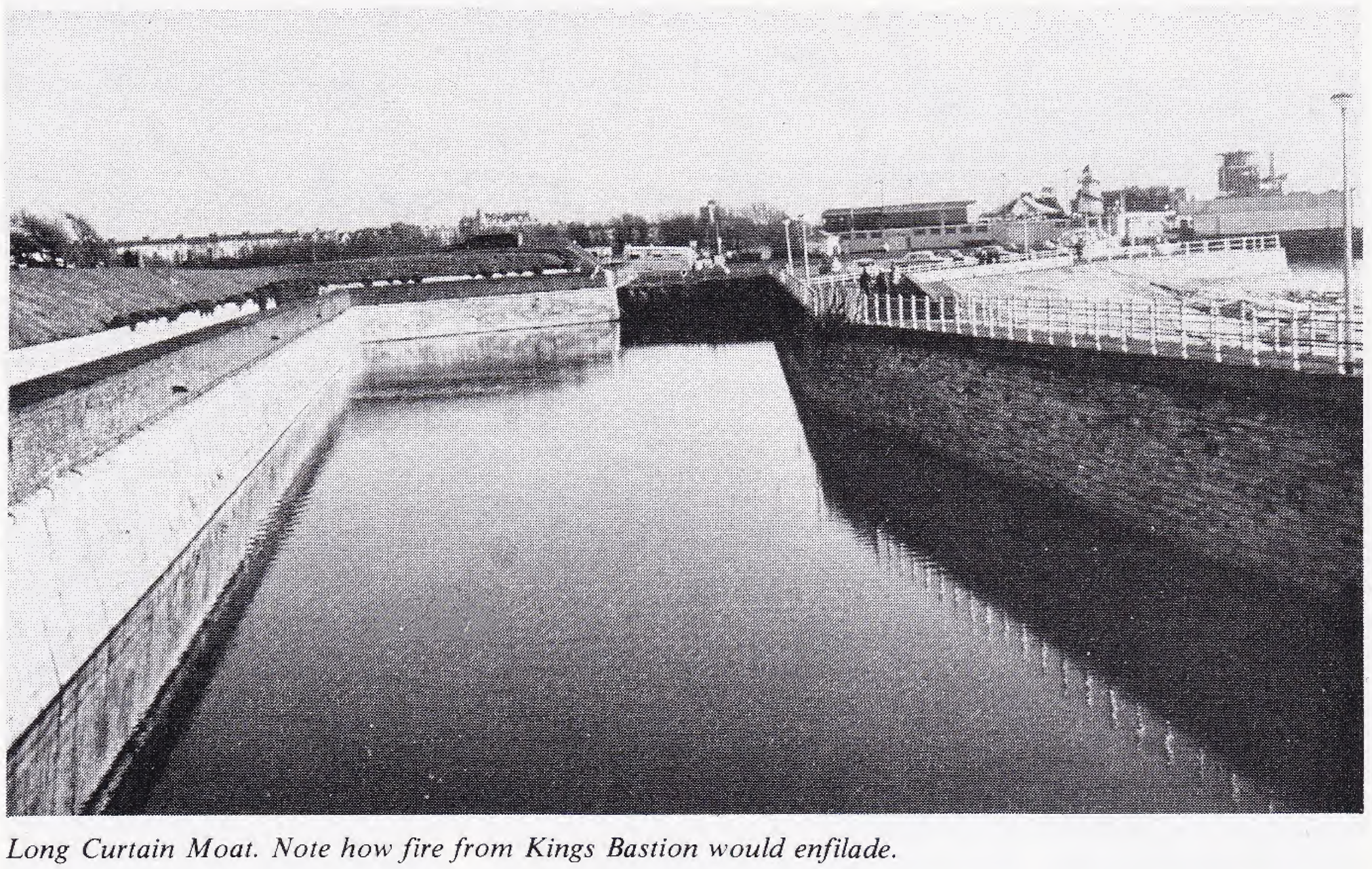
When thirty six year old James Duke of Monmouth, illegitimate son of Charles II, former commander of English forces under Turenne and former Captain General of Troops and Land Forces in England and Wales, landed at Lyme Regis on the 11th June, 1685, intent on deposing his uncle King James II he brought civil war to the land again. His small force of ships had eluded the navy at the Nore and in the Channel and indeed not one single First, Second or Third rate ship had been in commission to oppose him when he sailed from Holland but as his deep green banner was unfurled Portsmouth prepared to act for his downfall. On June 16th, the governor Lord Edward Noel dispatched four iron three pounders and four brass falcons which were to reach Sherbourne on the 22nd whilst already patrols at sea had brought into Portsmouth a Dutch



The Fortress Area in the 17th Century after the work of Sir Bernard De Gomme



Point Battery and "Hot Walls" from where red hot shot was fired. Guns on two levels provide concentration from small surface area.



Long Curtain Moat. Note how fire from Kings Bastion would enfilade.

munition carrier suspected of running west down the Channel to Monmouth's aid. Although this campaign which was to end so decisively at Sedgemoor on July 16th was short lived, as were many of Monmouth's followers afterwards, it is important in showing Portsmouth's geographical position on London's land and sea flank and how she could act against an enemy who might try to reach London.

WILLIAM OF ORANGE

Over thirteen centuries two themes emerged; the size of the forces sent against this country grew as the stakes became higher and secondly defensive works became more elaborate; but did the principles change? Six hundred and twenty two years after William the Conquerer another William proved that they did not but raised one most important argument. The argument was concerned with whether the Royal Navy on the high seas should be considered the first line of defence against which an invasion force could be allowed to break itself before ever reaching our shores and therefore should the navy with its mobility be considered as being more important for defence than any static fort which had to be placed close to the location it was protecting.

Monmouth's action had precipitated a major military operation but the size of his force made it almost a raid as his followers had been made up largely of Englishmen recruited after he landed. He had come almost without supplies or finance. Would the result have been different had he brought a well found force with him? In 1688, three years after Monmouth's episode and whilst his followers' bleached bones still swung from the gallows the question was answered. William of Orange secured his land frontiers in Europe by alliances, stripped naked the secrets of James' defences by an astute intelligence system and set sail from Dutch territorial waters with an invasion force of fifteen thousand men. He brought eight thousand horses, artillery, vast quantities of ammunition, spare clothing, boots and money to buy what he could not carry enough of. He safely passed Lord Dartmouth's ships whose scouts had been forced back by bad weather, saw Dover on his starboard side in broad daylight, passed James' strongest southern fortress, Portsmouth, and the Isle of Wight at dawn and reached Torbay on November 15th to land his army safely in little over twenty four hours and during winter. Only a few weeks later he entered London on December 18th/28th a victorious conquerer the future William III.

You could be forgiven for thinking that James must have been without troops, ships, resources and acting without confidence or friends. In fact his army comprising almost all of his standing regiments had massed at Hounslow on the hinge of the three great internal highways, the Great Western Road, the Great North Road and the Portsmouth Road; his fleet under Dartmouth with more than fifty ships was able to patrol from the Thames to all the danger areas, his confidence was high enough to permit the refusal of a French fleet to assist him in the Channel and he felt he had weathered the worst of his storms. The ferocity of Judge Jeffries three years earlier had assured that in the very area where William landed the local population would stand aside, they knew treason brought death. The south west could be assisted again by Portsmouth with its new fortifications which William himself felt were too strong to attack yet still James was beaten. The truth was he was beaten bloodlessly, the country was already turned against him and his policies, indeed in Portsmouth's area the governor of Yarmouth Castle wrote "part of the meletia is growne mutinous already" and this when William's fleet was but fifty miles away having passed the King's navy which was not wholeheartedly ready to do the King's bidding.

THE EIGHTEENTH CENTURY

This century saw an extension of the principle of protecting the front or harbour approaches by greater fire power. On the Gosport side this was achieved by a new Fort Blockhouse and Fort Monckton and on the Portsmouth side by batteries at Lumps and Eastney

and a new fort called Cumberland at the entrance to Langstone Harbour. To protect the vastly expanded dockyard and adjoining town of Portsea, which had grown up to house its work force, they were enclosed on a similar but more massive scale than de Gomme's works around Portsmouth itself. An attempt was made at defending the whole of Portsea Island by building a continuous rampart and moat at Hilsea and surveying emergency sites for trench works to link up the town defences with the out lying works. These operations did not follow a master plan nor were they uninterrupted, for example, the century had begun with Anne authorising expenditure of one hundred thousand pounds in 1704 but twelve years later there were proposals to reduce the gun armament of the area from 787 to 252. Some reduction did take place, down to 295 pieces by 1725, but not to the extent envisaged. By this time there had been rebellion in Scotland and this was to re-occur in 1745 before the construction of the new detached forts and batteries really began in earnest. This century added many important events to history, the victories of Marlborough; those at Quebec, Minden and Plassey; Rodney's triumphs in the West Indies and Jervis's at Cape St. Vincent but the century which showed early promise with the taking of Gibraltar saw in its final years French forces in Jersey, Ireland and Wales. It was also the century of Saratoga and Yorktown and 1779 was its year of a great invasion attempt.

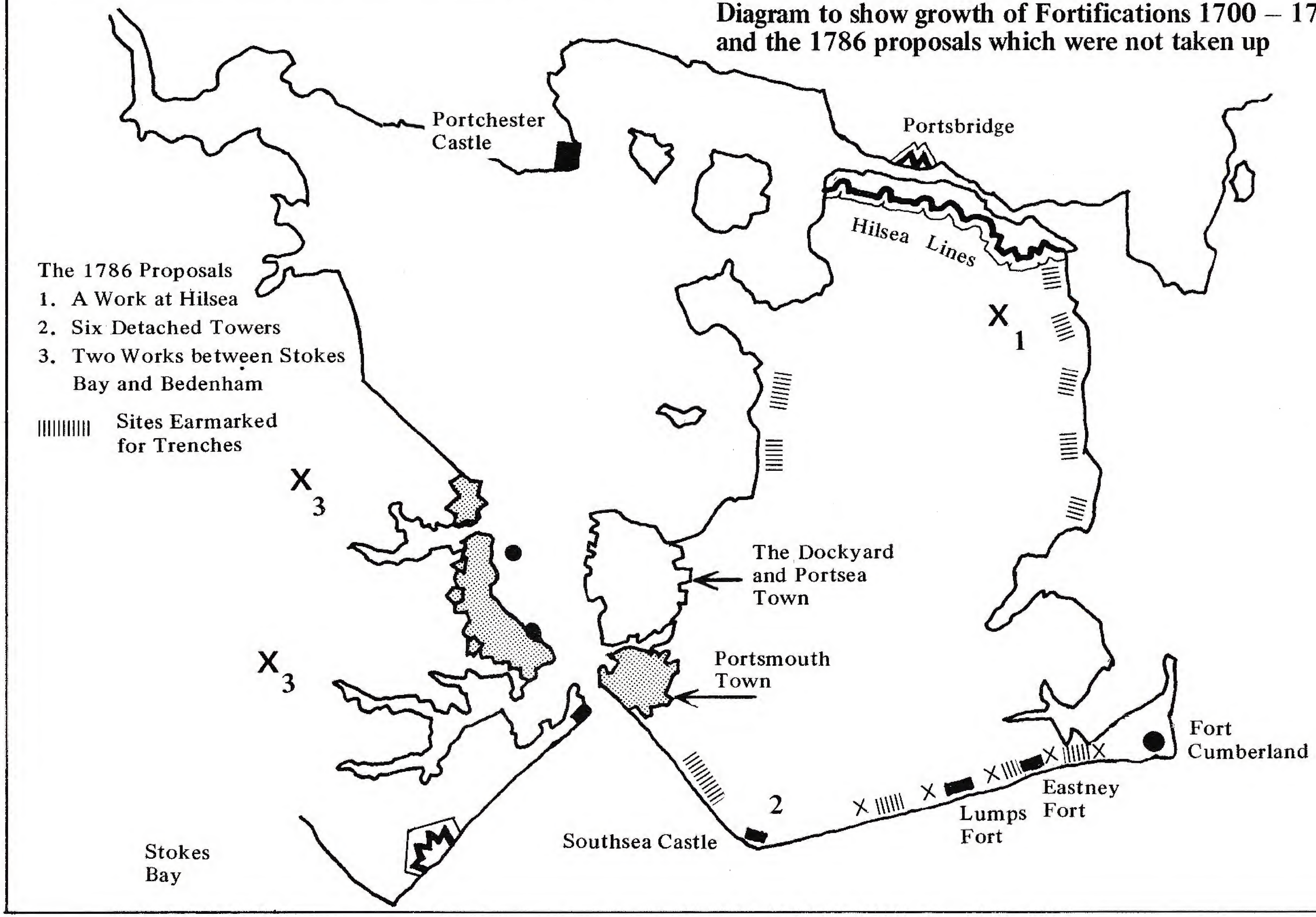
When in 1779 a Franco/Spanish fleet bore up the Channel there was no Drake to harass from windward only a fleet tacking westward to meet it. At Plymouth, where General Lindsay expected the dockyard to hold out for only six hours, the landing was reported rather than actual and the force then did not proceed to Portsmouth. Had it done so its intelligence that Lt. General Robert Monckton's force numbered no more than one thousand would have been proved correct. The beaches from Browndown to Eastney were vulnerable. Monckton had often repeated earlier warnings but it was left to him to plan the digging of emergency trenches and the removal inland of French prisoners as additional contributions to the area's safety. Had he been attacked on the scale contemplated at any of the landing points considered he would have been hard pressed and the chance of early relief from the standing army would have been slight. Most of it was in Kent and Essex to cover the capital although many felt that concentrations in three permanent groups in Kent/Essex, Hampshire and Devon would protect not only London but the whole of the southern area previously favoured for landings.

1793-1815
THE WARS WITH REVOLUTIONARY FRANCE AND NAPOLEON I

Until 1793 England had generally to contend with an invasion threat from one or possibly two directions at one time. During these wars she was opposed by an enemy who controlled much of the European coastline from northern Germany to southern Italy. This meant that the number of ports from which a force of sufficient size to mount an invasion could sail and which had sufficient troops close at hand for speedy embarkation to do the job was so greatly increased that the possibility of multiple landings arose. In addition for the first time England was opposed truly by nations under arms and not just the smaller mainly professional or privately financed forces of the past and furthermore by nations bound together and directed by effective leadership.

The importance of these wars in the context of invasion was as follows. From the earlier years when Admiral Howe won a tactical Victory at "The Glorious

Diagram to show growth of Fortifications 1700 – 1793 and the 1786 proposals which were not taken up



1st June" whilst the country suffered a strategic defeat and the Royal Navy was inferior in organisation and scientific advance to the French; from times when the French were able to land at Killalo, Rutland Island, Ilfracombe and Fishguard Bay and make other threats or sorties close in shore the Royal Navy reversed the position by vigorous action which ultimately left the enemy's ships and morale to rot in her harbours. Landings, raids, bombardments and cutting out expeditions such as Sicily, Toulon, Cadiz, Ferrol, Belleisle, Quiberon, Granville, St. Marcouf, Dieppe, Calais, Boulogne, Flushing, on the Bruges canal locks at Ostend and near Den Helder were not all successful but did carry the action to the enemy. In addition minor operations, close watches and blockades on main ports and many actions by single ships or small groups were effective along the Atlantic and Channel coasts in keeping the enemy in harbour much of the time. When a large enemy force did assemble on operations of great strategic importance the Navy was able to shatter them before their progress could harm us. The battles of the Nile and Copenhagen are examples of these actions whilst Duncan's action at Camperdown, Jervis's at St. Vincent and Nelson's at Trafalgar all prevented incursions into home waters which could have meant the loss of naval superiority in the Channel and a prelude to invasion.

At home the war saw the creation of the most extensive range of fortifications and batteries around the coast ever seen and the rise of a great army. This army included many volunteers keen to protect their homeland and willing to serve not only in their own towns and villages but in other counties and indeed other lands. The Navy and the fortifications formed two lines of defence and because the second was not called upon to fight off a major assault the seed of future arguments that the second would never be necessary or called upon to fight and should therefore be dispensed with was sown.

The Portsmouth area became an armed camp the defences of which were modernised and up-gunned in places so that by 1805, the year of Trafalgar, the gun dispositions in the greater "Fortress Portsmouth" area were:-

	POUNDER GUNS											*CARRONADES*						
	42	*36*	*32*	*24*	*20*	*18*	*12*	*9*	*6*	*4*	*3*	*68*	*32*	*24*	*18*	*12*	*9*	*6*
PORTSMOUTH HARBOUR		19				18	33	30	22					4				
PORTSEA DOCKYARD		28	14			43	4											
SOUTHSEA CASTLE			8						5									
LUMPS FORT			3															
EASTNEY FORT			3															
FORT CUMBERLAND				8		41	25		7									
FORT BLOCKHOUSE		15				15												
GOSPORT WORKS				19		36												
PRIDDY'S HARD						14												
FORT MONCKTON		24				23	12											
YARMOUTH								4	8									
FRESHWATER						3												
COWES CASTLE								10										
SANDOWN FORT						20												
CALSHOT CASTLE						9			4									
HURST CASTLE				6			18											

Fort Cumberland. Built during the wars with France which lasted from 1793-1815. It is now the finest surviving example of a late 18th Century Bastioned Fortification. The five points are "Bastions"; the walls between "Curtains" the "Star" shape allowed enfilade fire to be directed along each part of the stone walls.

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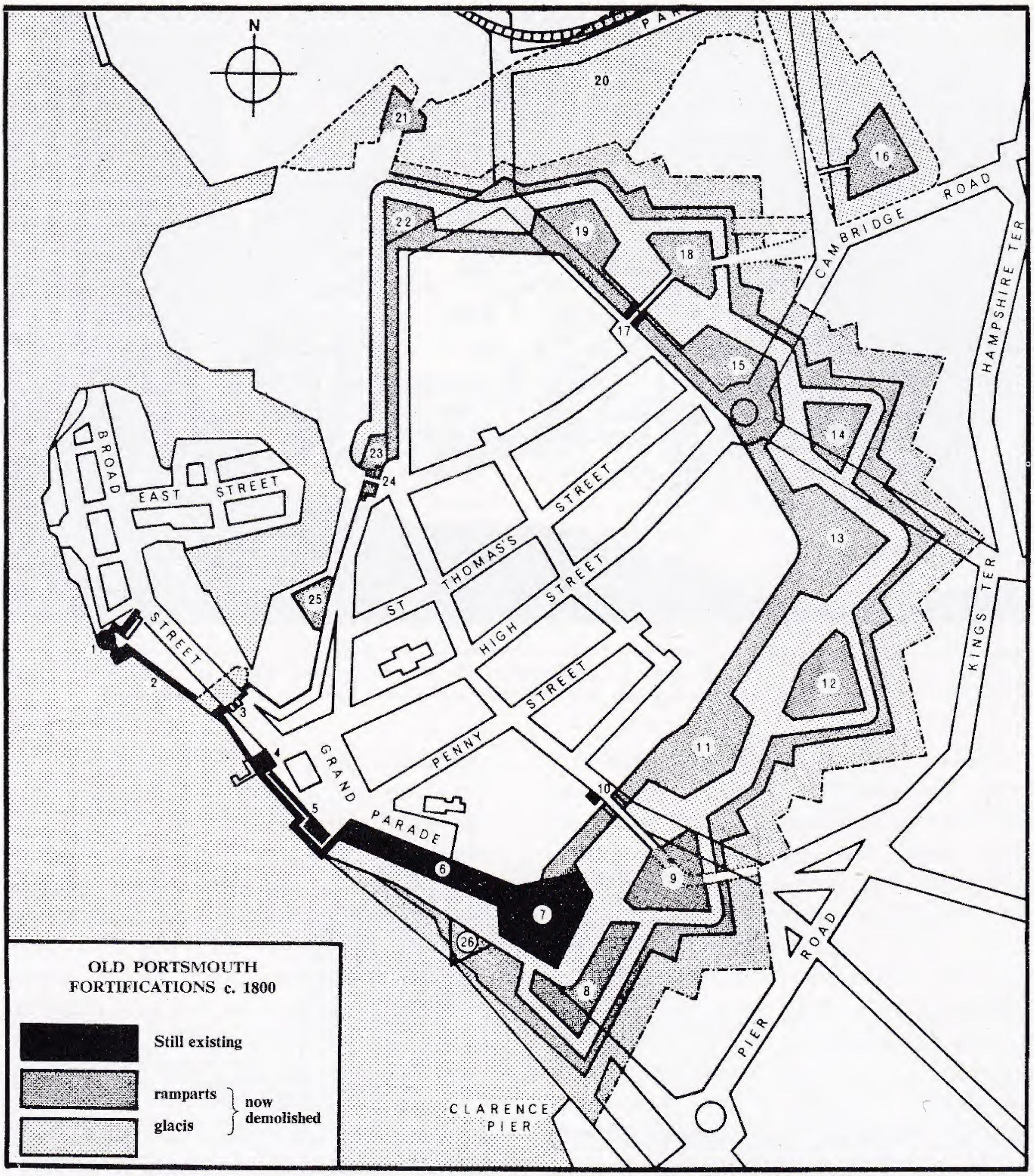
During these wars Hilsea Lines and Fort Cumberland were rebuilt and fortifications, batteries and barracks were used by marines or regular regiments billeted locally. There were also infantry companies drawn from and named after local towns, e.g. Portsea, Gosport, Portsdown, Fareham, Havant and Emsworth, men of militia regiments such as the Flintshire Militia, men in the volunteer companies brought in for fortnightly periods from their own counties to serve in a coastal district, French Emigrés regiments. Hessian troops from Germany and veteran battalions of recovered casualties. There were also volunteer artillery companies and cavalry both regular and volunteer, the latter such as the York Chasseurs. When Portsmouth again ended the war unassaulted many realised that it had been a "national" war unprecedented in might and fury and our victory had been a close run thing. To all the Navy had been of paramount importance.

After 1815, when the Royal Navy was the first and only powerful navy in existence, came the usual reductions of navy and army and an era began in which the significant advances in industry and commerce and even the slower social changes contrasted favourably against the almost non existent advance in military and naval thinking. For both services there was little activity apart from naval actions like Navarino and for the army the suppression of internal troubles such as the 1830 Agricultural Riots. On the other side of the Channel however a vigorous naval rebuilding programme was carried out and fears of a French and Russian alliance arose. When these fears were voiced in 1838 the Royal Navy had ninety ships of the line to a combined French and Russian total of ninety nine. More significantly the French and Russians far outweighed us in war steamers with a ratio of nearly four to one. Even the timely aid from the Bank of France which staved off bankruptcy for us in 1839 and the respite of the Crimean War from 1854 to 1856 when we fought with France against Russia did nothing to really calm these fears which



OLD PORTSMOUTH FORTIFICATIONS BUILT IN THE PERIOD UP TO 1800 INDICATING THOSE THAT STILL EXIST

1 Round Tower
2 **Eighteen-gun Battery,** part of Point Battery
3 King James' Gate
4 **Square Tower**
5 **Saluting Platform**
6 **Long Curtain**
7 **King's Bastion**
8 King's Counterguard
9 King's Ravelin
10 King William's Gate
11 Pembroke Bastion
12 Montague Ravelin
13 East Bastion
14 East Ravelin
15 Town Mount Bastion
16 Amhurst's Redoubt
17 **Landport Gate**
18 Landport Ravelin
19 Guy's Bastion
20 Mill Pond
21 Mill Redoubt
22 Beeston's Bastion
23 Legg's Demi-Bastion
24 Quay Gate
25 Camber Bastion
26 Spur Redoubt

Bold type indicates fortifications still in existence

Courtesy of Portsmouth Museums Dept. and "Fortifications In Old Portsmouth" by A. Corney.

erupted periodically over the next sixty years.

1859
THE MOVE TOWARDS CO-ORDINATED DEFENCE

By 1859 Britain was again full of public fear caused by our supposed inability to defend ourselves. France was again the culprit. In the Crimea we had fought as allies. Her navy, which had taken to shell guns more quickly than ours, was the first with purpose built floating batteries and their army had been better led, equipped and more professional. With the French army's defeat of the Austrians at Magenta and Solferino in this year many wondered if that army, under the rising star of Napoleon III, might turn on England.

A generation earlier the forces of Napoleon I had been kept back by the supreme power of the Royal Navy; a commission sat in 1859 to consider the defences of the United Kingdom and remembered that. They favoured fortifying Portsmouth and other places, their most important conclusions being:-

> They accepted that the Channel was our first line of defence but to defend it the Navy would have to be on hand to meet at all times any force which could be combined and brought against it by one or more nations. As steam power favoured easy concentration it would have been too costly to keep a large enough fully manned fleet in the Channel at all times to meet all contingencies. It was felt that even a fleet as strong as that held during the Napoleonic Wars would not be sufficient to leave such a force in the Channel and also protect our world wide trade, vast colonial empire and lines of communication as was then necessary.
>
> It was accepted, barring outside chances they recommended ignoring, that a successful invasion could not then be prevented. The enemy had the whole Channel coast to choose from and could use coastal and fishing as well as war vessels as transport. Finally it was accepted that our army was always smaller than continental ones and because of colonial commitments often largely abroad. The commission said "having carefully weighed the foregoing considerations, we are led to the opinion that neither our fleet, our standing army, nor our volunteer forces, nor even the three combined can be relied on as sufficient in themselves for the security of the kingdom against foreign invasion".

Ever since these words were written they have been opposed by those who believed that the Navy could have been relied upon at all times to defend the country had money not been diverted to fortifications. Without arguing the point let Admiral Lord Brassey, a pro navy man, put the case in support of the commission's findings with words written nearly fifty years afterwards. ' *It follows therefore that sedentary defences need only be of moderate dimensions except where it is contemplated, as was done by Lord Palmerston when he initiated the Portsmouth (1859) fortifications, that the sedentary fortifications should defend the fleet itself*". He was echoing the commission's findings that there must be fortified places for a fleet to gather in or return to for repairs or protection as the situation dictated.

The commission believed that fortifying the dockyards would tip the balance in favour of our being secure. Assuming there were no fortifications their line of reasoning was:-

1. An enemy fleet combines to get temporary Channel superiority, lifts a large body of troops and deposits them on our shore as a single group to form a bridgehead whilst small craft put other parties ashore elsewhere. All done in say twenty four hours.
2. Our regular troops combine into a

manoeuvring field army about the size of the enemy's main force and positions itself to stop that force moving.

3. The enemy meanwhile, using the ease of movement conferred by the sea and steam, puts a force down near a harbour and dockyard and takes them because they are unfortified.
4. Our field army and the enemy's first force cannot move, each check-mates the other.
5. The enemy now have a harbour and dockyard to operate from and turn temporary Channel superiority into permanence or as a counter to bargain with.

This result could be avoided by a larger standing army but this was considered too expensive and less economic than the use of fortifications. If the harbours were fortified a very small body of men could hold off a much larger force and even in peace time a scratch force could always be pulled together from the military and naval personel in the area plus impressed or volunteer civilians.

Costs were to be kept to a minimum by fortifying only those places which could be of great value to an enemy in damaging the navy rather than all places where a landing might be made. By fortifying such places which the navy depended upon an enemy would be forced to commit more in the first assault on them and would probably not be able to carry out large feint landings elsewhere at the same time. The greater the localised strength of the fortress areas, Portsmouth, Plymouth, Portland, Pembroke, Dover, Chatham and the Medway the greater would an enemy's exertions have to be to take one of them.

Having decided that the cost of fortifications would be less than the cost of a much larger necessary standing army or navy the committee then decided that both the dockyard itself and the Spithead anchorage had to be defended. The following two paragraphs from the report show the importance of firstly Portsmouth's dockyard and secondly the Spithead anchorage.

"The dockyard is the most important establishment of that description in the United Kingdom, not only as regards its capability for building, repairing, and refitting ships of war, and the vast amount of stores of every denomination accumulated there for the service of the fleet; but also from its central position on the south coast of England".

"Under any circumstances, and considering the importance of Spithead as an anchorage, and as a place of refit for our fleets, without reference to Portsmouth as a Military position, no pains should be spared to render it secure from attack, not only by an enemy in force, but from desultory attacks by powerful cruisers, which in its present state would often be perfectly practical under steam. It should be born in mind that in all former wars, Spithead has been used as a perfectly safe rendezvous for a fleet; receiving ships, sheer-hulks, and many other extensive repairs by shipwrights, artificers, and riggers have been carried on at Spithead; and no ship used ever to be allowed to proceed into harbour, merely for victualling and watering, or completing the ordinary supplies of stores and ammunition. All these operations were still required to be performed at Spithead, in addition to coaling, which will hence forth be not less important. Convoys of more than a hundred sail of merchant vessels at a time have been assembled at Spithead; and when all these circumstances are considered, it appears that the secure use of that anchorage, or at least of some portion of the space within the Isle of Wight, for the purposes above referred to must be a matter of scarcely less importance than the security of the naval arsenal itself".

A further paragraph from the report drew together the threads woven in earlier pages which recount the part Portsmouth played or influence it

wielded in earlier times when invasion, raids or threats were current news. The report said "In addition to the value of Portsmouth as a naval station, it occupies a strategical position of considerable importance in case of invasion; lying as it would upon the flank of an enemy advancing upon London, either from the southward or south-westward, and consequently obliging him to detach a portion of his army, to prevent the garrison acting upon his communications". The committee then divided the defence problems into six parts and various fortifications were recommended to take care of each of the problems.

The lists and maps which follow indicate the sites surveyed and recommended for some military purpose or other. The exercise was not carried out with a "money no object" attitude and the forts and batteries which were proceeded with were felt by the commission to fulfil the general objects and main principles of adequacy in strength with economy in cost. Other principles were:-

The Time Factor

The forts were to prevent enemy success by surprise i.e. to combat a raid by say 20,000 troops embarked in France one evening and landed in England the next morning. In peace time therefore they were not to be fully manned, if a raid occurred all available troops, sailors, volunteers and impressed local civilians would be used to supplement the permanent force in each fort and take up positions where the ground was advantageous to defence along the front attacked. They would be supported by horse artillery batteries kept for this purpose. In peace time the forts would provide barrack accommodation.

The Man Power Shortage

Any fortification is intended to help the weak hold back the strong, 5,000 men along Portsdown with the forts would have held back 15,000. As the regular defenders would be supplemented by a scratch force of available men who might be unused to field operations the forts were constructed in such a way that the "Front" attacked could make the best use of all men available. (Remember if all fronts had to be defended because the enemy was threatening them all it would have meant that a force of perhaps 80,000 to 100,000 men had landed. Portsmouth then would have had to adopt siege tactics in order to retain its integrity as a rallying point for southern forces against what would have been a full scale attempt to over run the country rather than a raid to destroy a naval arsenal.

The Need for Artillerymen

Gunnery is a science, what if all these forts were built and there were no artillerymen? The commission considered this and decided that sufficient gun commanders could be trained to control the guns whilst others for crews needed little training.

The March of Science in Artillery

As old guns were replaced by new in ships and batteries should they be broken up? The commission did not think so and recommended the guns be used as follows so that the best use and maximum fire power could be obtained. The newest guns were to be mounted in each fort to provide the real strength of fire power and to operate continuously whilst under attack, they would be looked after by permanent troops and be the main ones to fight a raiding force arriving with no warning at all. Obsolescent guns would in the main be stored in the forts which were to use them but a small number would be mounted to supplement the newest guns. The unmounted ones would need mounting and this would be done on a warning of danger. Other obsolescent and obsolete guns were to be stored in arsenals near to each front and would be mounted to supplement the other guns if there was a threat of war extending over some weeks and the need to make

use of all means of defence available. As newer guns were developed they would replace the most up to date guns already mounted and each gun would in turn pass through the stages above.

The six aspects to defence as the commission saw them were:-

Purposes of the Defences - Sea

1. For the immediate defence of the entrance to the harbour, to prevent an enemy running his fleet in, and destroying the dockyard and shipping.

2. To prevent an enemy obtaining a footing upon any part of the shore within the fortified positions to landward between Browndown and Fort Cumberland; and affecting the destruction of the naval establishments by a force landed for that object.

3. The protection of the anchorage at Spithead; and that of the dockyard against bombardment by sea.

4. The defence of the Needles Passage.

5. To prevent an enemy obtaining a footing upon the Isle of Wight.

Purposes of the Defences - Land

6. To prevent the overwhelming of Portsea Island by a force operating from Portsdown Hill, or the bombarding of the dockyard or anchorages by artillery placed there or by the operations of any force attacking from the north having effected a landing outside the area which we shall call "Fortress Portsmouth" and marching by a land route to attack the area.

THE ISLE OF WIGHT DEFENCES

The commissioners did not believe in defending the whole of the Isle of Wight. Their defensive measures were concerned with providing strong areas at each end of the island together with a military road to connect them along the south side in order that any force being put ashore on that side could be dealt with quickly by the movement of forces from the ends.

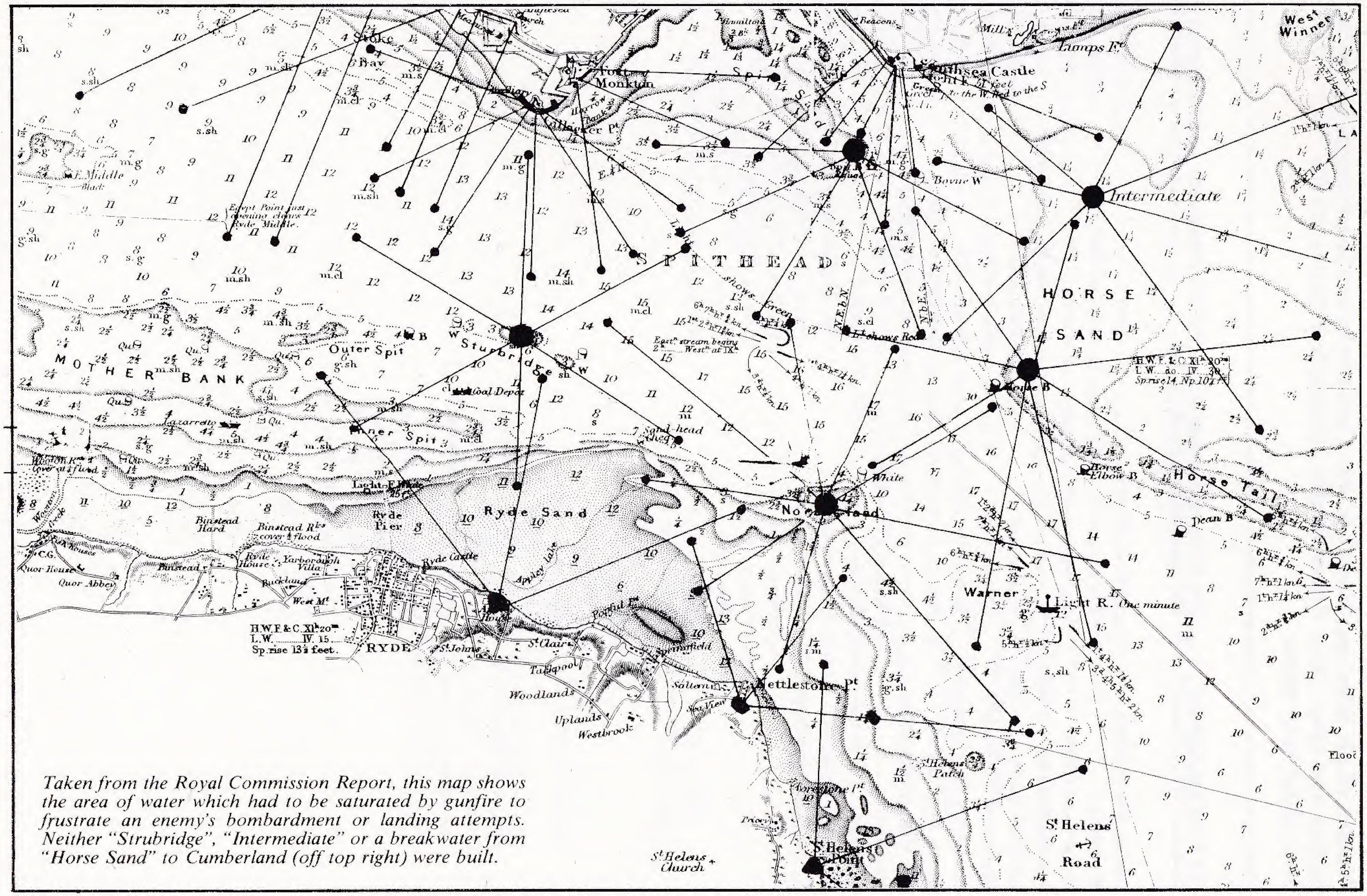
THE NEEDLES CHANNEL

Although only one thousand four hundred yards wide at Hurst a fleet at full speed on the flood tide would get some ships through, this the commission never doubted. The questions were how many and would they still be able to fight. The guns on this channel were intended to disable ships by smashing the armoured or lightly armoured areas, destroying the conning towers or bridges and spreading fire, damage and death to such an extent that it no longer mattered whether the ships were sunk or not. In addition, however, within the batteries there were stocks of armour piercing ammunition which would also have been used and were capable of sinking ships. The cost of success was therefore going to be put too high for an attacker to make the attempt.

To protect these batteries from attack from behind and to properly create the western defensive area a barracks and fort was placed at Golden Hill in the "Gorge" of the defended area.

SANDOWN BAY

It was important that an enemy should not take the Isle of Wight. The northern shores were protected whilst on the south only small measures were necessary. Sandown Bay however afforded the best and only good landing place between the Needles and Spithead on the south side. The sandy beach was generally clear of rock, 2,000 yards wide and with 600 yards available for landings at all states of the tide and there were five fathoms (30 feet) at low water within 550 yards of the shore. Batteries were provided to prevent any landing and the batteries were themselves protected in the rear by Bembridge Fort.



Taken from the Royal Commission Report, this map shows the area of water which had to be saturated by gunfire to frustrate an enemy's bombardment or landing attempts. Neither "Strubridge", "Intermediate" or a breakwater from "Horse Sand" to Cumberland (off top right) were built.

Names of all Sites mentioned in the Commissioners Report together with earlier and later Sites. Those finally adopted are shown on the individual area maps.

Sea Front and Spithead Defences - Outer Line (1, 2, & 3)

Appley House (1860)
Breakwater
Horse Sand (1860)
Intermediate (No. 1) (1860)
Intermediate (No. 2) (1860)
Nettlestone Point (1860)
New Work Near Nettlestone
Nodes Point Battery
No Mans Land (1860)
Puckpool
St. Helens
St. Helens Battery
St. Helens Point (1860)

Sea Front and Spithead Defences - Inner Line (1, 2 & 3)

Anglesea Barracks
Blockhouse
Browndown No. 1 Battery
Browndown No. 2 Battery
Cumberland
Charles Fort
Eastney Barracks
Eastney Fort (the old one)
Eastney Fort East
Eastney Fort West
Gilkicker
Gosport Lines
Gunner Point
James Fort
Lumps Fort
Monckton
Naval Barracks
Portsmouth Lines
Ryde Sands Fort
Southsea Castle
Spit Bank
Spit Sand (1860)
Spit Sand 2nd site
Stokes Bay No. 1 Battery
Stokes Bay No. 2 Battery
Stokes Bay Site Between No. 2 and 3 Batteries
Stokes Bay No. 3 Battery
Stokes Bay No. 4 Battery
Stokes Bay No. 5 Battery
Stokes Bay Site Near No. 5 Battery
Sturbridge (1860)

Needles Passage (4)

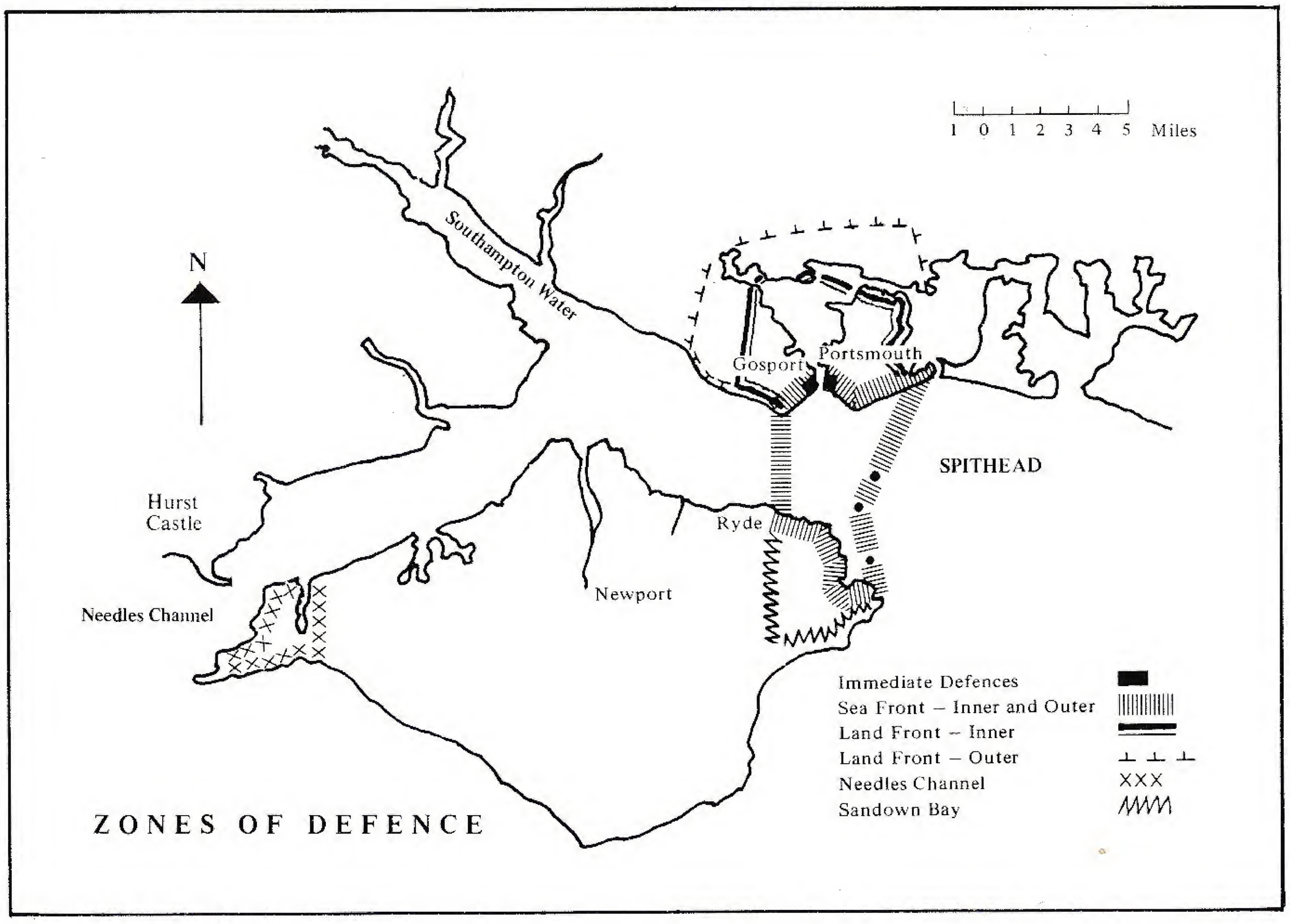
Albert
Bouldner Battery
Calshot
Cliff End Batteries (1860)
Cliffe End Fort
Freshwater
Golden Hill
Hatherwood (1860)
Hill Farm (1860)
Hurst Castle
Needles
New Needles Battery
Sconce Point Battery
Site Near Cliff End Fort
Totland Point (1860)
Victoria
Warden

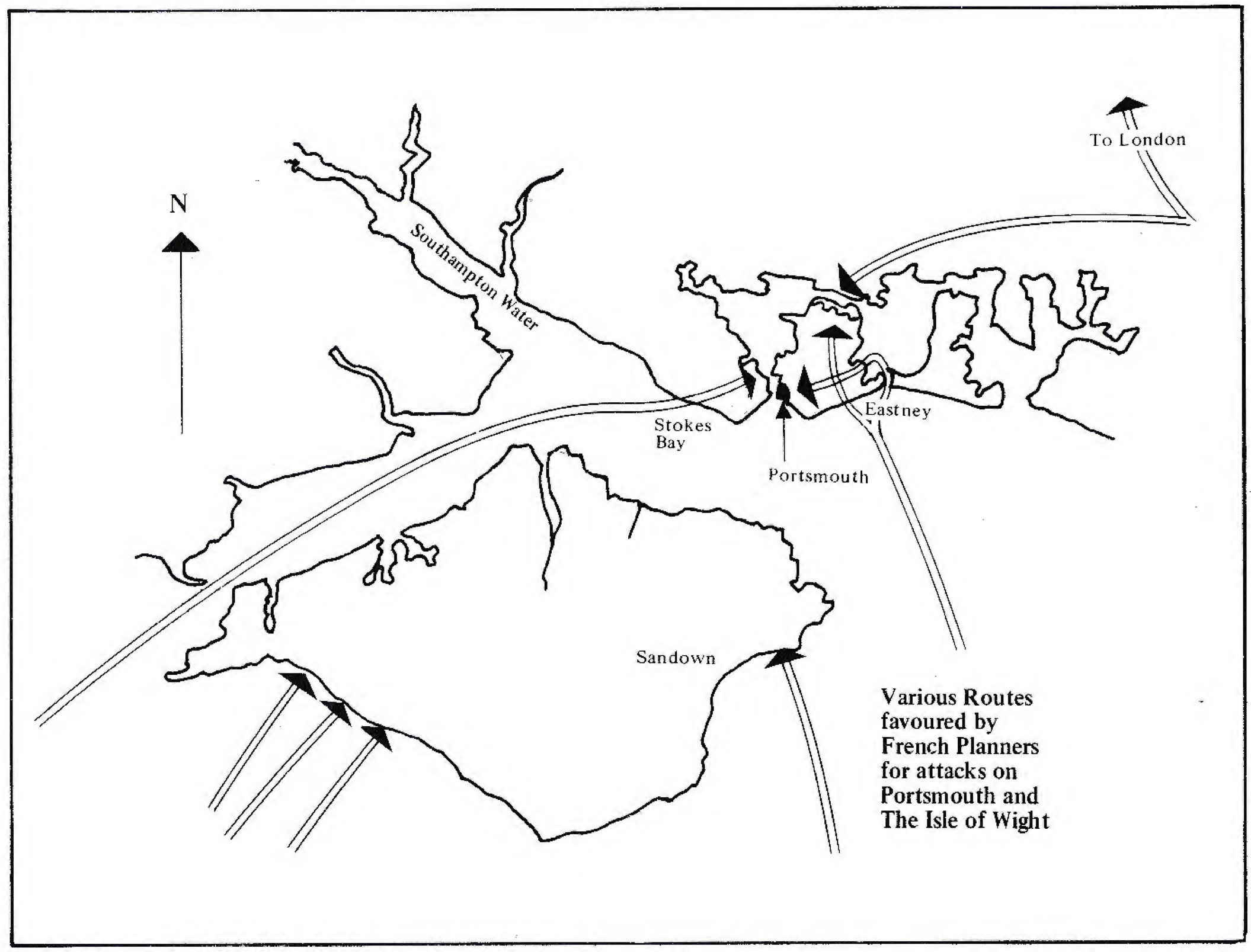
Sandown Bay ar Southern Coasta

Atherfield Point
Barrack Battery
Bembridge Dow
Brook (1860)
Brixton (1860)
Military Road
Near Languard (
Near Yaverland
Redcliffe Battery
Sandown Barrac
Sandown Bay (1
Sandown Fort

The numbers refer to the "Purposes" Page 28. Also included are some barracks and a station which need to be considered in examining some aspects of the defences.

d Island Defences (5)	Land Fort - Inner Line (left of Fareham Creek) (6)	Land Front - Inner Line (right of Fareham Creek) (6)	Land Front - Outer Line
(1860)	Brockhurst	A Work at Hilsea (No. 1)	Batteries in Advance of Elson Gomer Line
	Elson	A Work at Hilsea (No. 2)	
(1860)	Forton Barracks	Forts in Rear of Hilsea Lines	Crookhorn Redoubt
	Four Batteries Stokes Bay	Hilsea Barracks	Detached Works on Farlington Marshes
	Gomer	Hilsea Lines	Farlington Marshes Line
860)	Gomer Monckton Line	Horsea Island	Fareham
1860)	Gosport Station	Old Hilsea Lines	Fareham Line West Flank (1860)
(Culver)	Grange	Pewit Island	Farlington Lines East Flank (1860)
s (1860)	Lines Connecting Forts Between Gomer and Elson (1860)	Portchester Castle	Farlington Redoubt
60)	Rowner	Two Small Works in Rear of Hilsea Lines	Fir Clumps (1860)
	St. George Barracks		Near Newgate (1860)
	Two Works Stokes Bay to Bedenham (1860)		Nelson
	Work Before Haslar		Purbrook
	Work in Rear of Gomer Monckton Line		Southwick
	Work before Priddy's Hard		Three Minor Works (1860)
			Two Detached Works (1860)
			Wallington
			Widley
			Windmill (1860)
			Work Near Room in Advance (1860)
			Work Near the Shore in Advance of Browndown (1860)
			Extreme Northern Approaches
			Extreme Eastern Approaches
			Extreme Western Approaches


1 0 1 2 3 4 5 Miles
N
Southampton Water
Gosport
Portsmouth
SPITHEAD
Hurst Castle
Ryde
Newport
Needles Channel
Immediate Defences
Sea Front – Inner and Outer
Land Front – Inner
Land Front – Outer
Needles Channel
Sandown Bay
ZONES OF DEFENCE

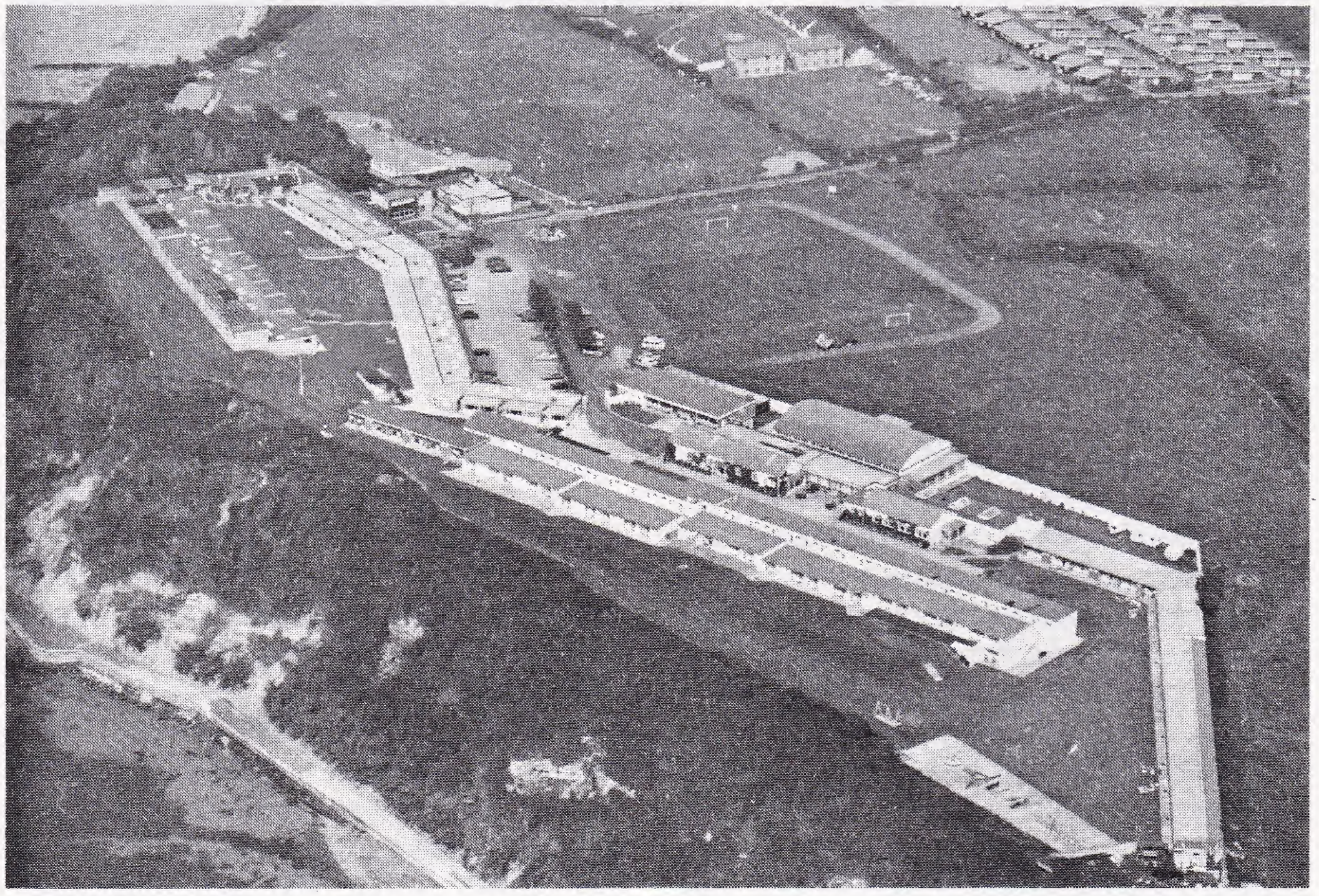

To London
N
Southampton Water
Stokes Bay
Portsmouth
Eastney
Sandown
Various Routes favoured by French Planners for attacks on Portsmouth and The Isle of Wight

Hurst Castle covering the Needles approach to Portsmouth and itself protected in the rear by a water approach.
AEROFILMS PHOTO

SEA FRONT - OUTER AND INNER LINES

The purposes of these were (a) to stop destruction of ships at Spithead or the dockyard by bombardment from sea and (b) prevention of a force getting ashore to mount an attack. It was believed that because the dockyard presented such a large target and was full of combustible materials it could be ignited by gun fire and that there were ships guns capable of hitting it at 8,000 yards range. The pre 1815 defences however would have allowed ships to come much closer without even being within 3,000 yards of our guns and were therefore insufficient. Ships, especially when moving, present very small targets. It is difficult to know their actual direction and speed and therefore their exact position from a particular battery at any time. To overcome this problem sufficient guns had to be provided to give a reasonable chance of a hit by saturation fire. It was accepted that a determined force would get some ships through but their destruction within the area should be ensured. The sea forts, shore batteries

Hurst Castle. Note how it is protected by the wet ground behind and sea in front. Guns were in casements to give overhead protection and avoid overwhelming by ship's guns which would be above them. AEROFILMS PHOTO



Warden Point Battery on top of cliffs could have its guns without overhead cover because the chance of being overwhelmed by concentrated fire from ships was so much less; their guns being lower than the Battery's.
AEROFILMS PHOTO

Sandown Bay with Culver Cliff in distance, with Monument.

and forts were intended to overwhelm ships once within their area so that they could not bombard the shore or discharge troops or run in to block the harbour mouth. Of the guns some were capable of penetrating ships' main armour belts, others of smashing the secondary guns, communications and control of the ships whilst yet a third group, mortars, were intended to penetrate the ships' armoured raft decks by plunging shot. Later there were to be mine fields controlled from the shore and the inshore approaches covered by machine guns. The full quota of sea forts were not built due to foundation problems but the maps show that this did not much reduce the area of sea within the zone covered by heavy artillery at less than 2,000 yards from any ship.

THE LAND FRONT INNER LINE

This line consisted of a left and right flank. The left and right being taken as the left or right hand side for a person looking towards the way the enemy is expected to come from. The left of the line ran from Stokes Bay to Portsmouth Harbour and consisted of five detached forts. It would have linked up across the water via emergency batteries at Peewit Island, similar batteries and trenches around Portchester Castle and again more batteries on Horsey Island before joining with the permanent work of Hilsea Lines and this group made up the right flank.

THE LAND FRONT - INNER LINE - LEFT FLANK

The commissioners considered that where there was a direct line of sight from an enemy to a target as large as the dockyard a distance of 8,000 yards had to separate them. The distance from this

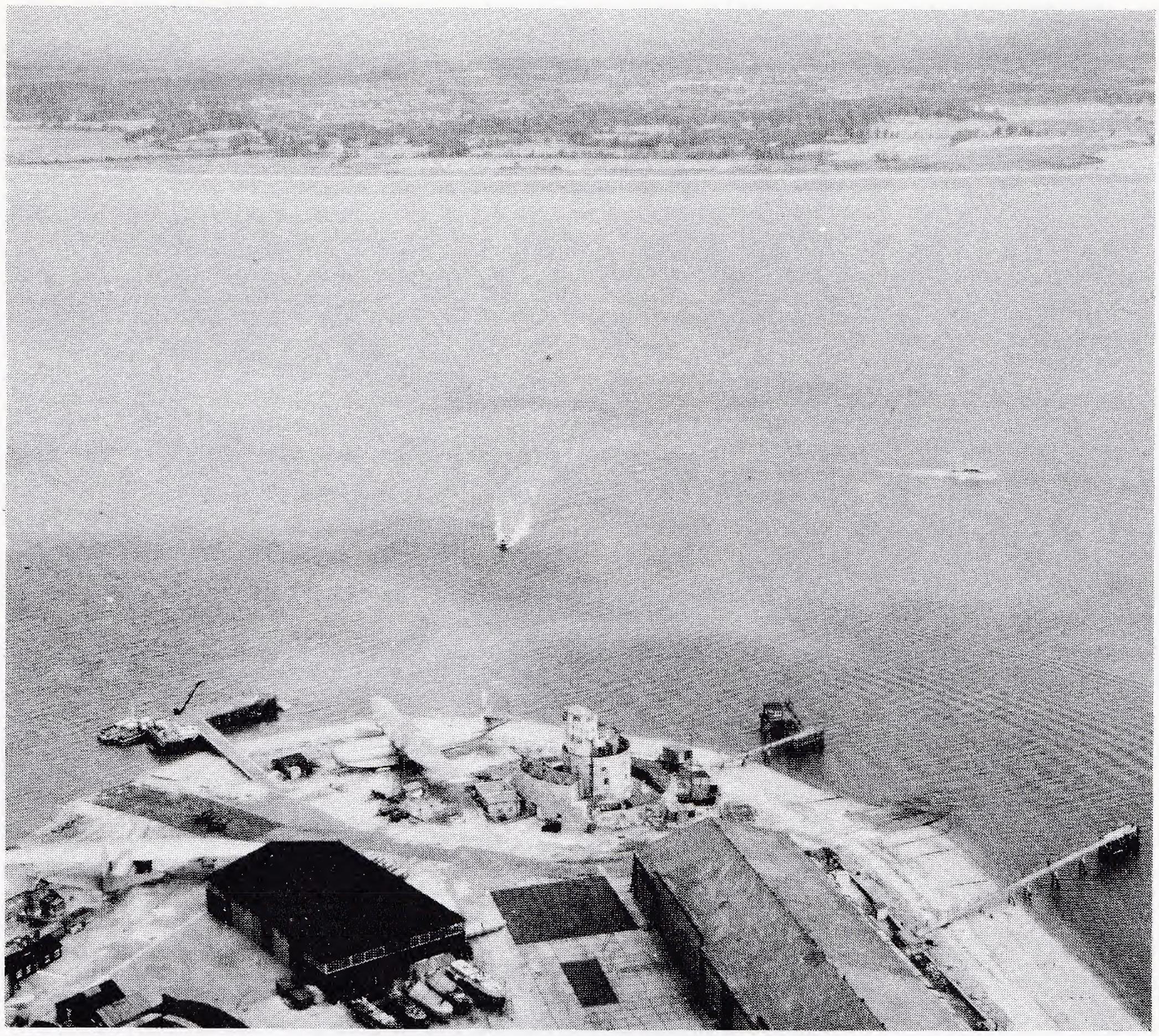
this line to the dockyard is 4,000 yards. With the full 8,000 yards which our artillery was as equally capable of as the enemy's it meant that no bombardment at less than 12,000 yards was possible without attracting counter battery fire. The line was not continuous, cross protection between the forts was as indicated on the sketch. Trenches between the forts would have been emergency measures together with flooding the ground in front of Gomer and Grange by closing the river Alver. The forts were hard on the front, or face, where earth protected the stonework and brick; and soft at the rear, or gorge, where a brick wall ran across the gorge with a "keep of last resort" in the centre. This was the arrangement for forts Grange, Rowner and Brockhurst; Elson and Gomer on the ends were pre 1859 designs where the gorge was closed by a defencible barracks. It was not accident that the rear was only lightly protected. The possibility of an enemy successfully assaulting one or more of the forts had to be realistically considered. If a fort was partially taken all of the rampart guns over run would be completely exposed at the rear to rifle fire from the barracks or keeps. If totally over run the adjoining forts, Gosport lines or guns in Monckton were capable of rendering those rampart positions untenable and smashing down the gorge walls to facilitate recapture.

THE LAND FRONT - INNER LINE - RIGHT FLANK

This flank had only Hilsea Lines as its permanent peace time feature. Their length and shape and how they covered the channel separating Portsea Island from the mainland can be seen from the photographs. These lines, with space on the ramparts for 168 guns, were commenced in 1857 prior to the commission's report and when they were out of effective artillery range from Portsdown Hill, but with the introduction of Armstrong guns this immunity changed and design alterations were made. To understand these lines you must assume you have made a fighting approach from the north over Portsdown or you have moved along the north of Portsmouth or Langstone Harbours. Your forces will advance across open ground to the tidal channel carrying boats or pontoons, as it is low tide you have only 105 feet of water to cross against a hail of shrapnel and case shot. Once across your men have about 100 yards of open ground before another 130 feet of water which cannot be waded through but must be crossed in the boats you have left. Once across they must fight their way up 30 feet of steep earth bank whilst being fired at from two sides with grenades raining down from above. If they succeed in taking the lines, but originally had bypassed Fort Widley they would find that her guns could reach them and make life difficult once more.

THE LAND FRONT - OUTER LINE

This line should have run from Stokes Bay via Fareham to the eastern end of Portsdown Hill and was to have consisted of several permanent works interspersed with emergency sites for batteries and trenches to be thrown up in time of danger. The maps indicate that only Fort Fareham, the hinge, was built on the Gosport side and not the other two forts. We have therefore only to consider the right flank from this hinge to Farlington Redoubt although even this line is greater than originally intended. (Originally at Fort Nelson, which is approximately due north of the line of Gosport's "inner line", a rampart and permanent trench was to have led down to the harbour and the cross section through the hills indicates why; the ground is less imposing west of Fort Nelson and that position would have made a turning point.) The outer line deprived an enemy of a high vantage point from which batteries, troop movements, dockyard and ships were clearly



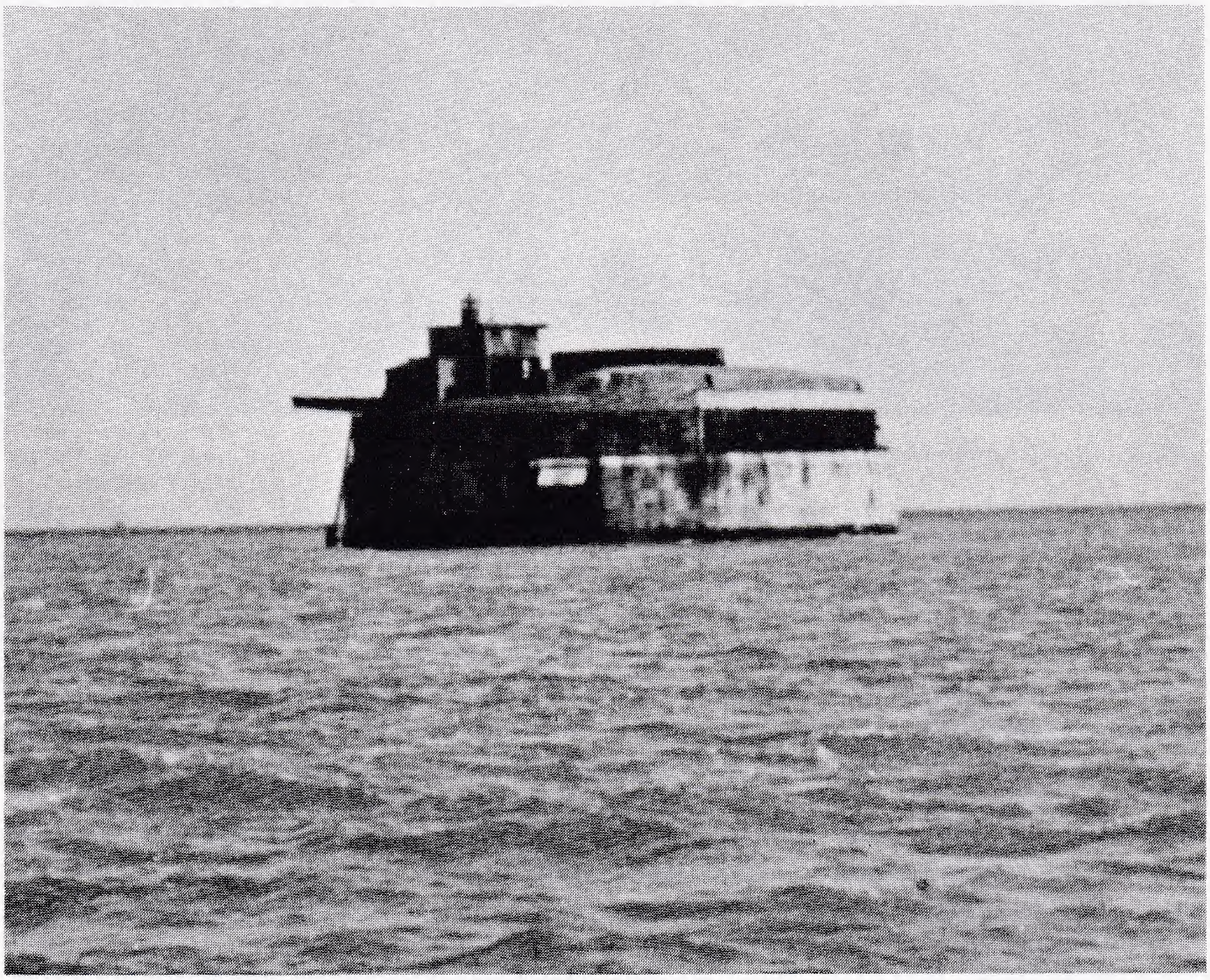
Calshot Castle looking towards Isle of Wight. AEROFILMS PHOTO

visible; and from where the affect of shell fire on the dockyard could be seen. The five main forts which were constructed along the hill covered most of the ground between them and down the northern slopes of the hill towards Boarhunt, Southwick and Purbrook. The long range guns were mounted on the ramparts whilst mortars in well protected batteries were intended to cover the more immediate ground. The whole of the ground was not however within direct line of sight from the five main forts and some of this "dead ground" had to be covered by the provision of two out-works in the east known as Farlington and Crookhorn Redoubts. To avoid the loss of gunners by silhouetting them against the skyline whilst they reloaded, the rampart guns were made on the disappearing "Moncrieff" principle. This allowed the barrel to be exposed whilst the gun was fired and for it then to drop down out of sight for reloading. Along the hill five thousand men could have withstood the attack of fifteen thousand toiling up steadily rising ground in the face of artillery, machine gun and musketry fire whilst endeavouring to bypass or overcome hedges, ditches, wet ground and in the case of Fort Purbrook the dammed up river Wallington which was a feature of the emergency additions to the defences. Men making the assault from the north would have marched some miles and might have had to make their assault without any intervening rest

period. In addition as they were to all intents and purposes temporarily cut off from their own supply lines they would of necessity have carried more ammunition, food and provisions than otherwise.

THE IMMEDIATE DEFENCES OF PORTSMOUTH AND GOSPORT

These lines, either built by de Gomme or extended from his lines, would have been the last to have actually been assaulted if a landing force had got ashore or penetrated the other lines. For this reason they fell largely into disuse and were dismantled to the greatest extent on the Portsmouth side. This was a mistake for although they could not have long withstood heavy artillery fire the era of the machine gun had arrived and at a very small cost, that of keeping them free from obstructions, an extra fortified line would have been available which could have been easily protected by wire. This could have proved a serious obstacle to tired troops who had already fought an advance over a considerable distance and it is worth noting that in 1944 at Brest the 8th Corps Engineer of the assaulting forces considered that the port was "a very tough nut to crack indeed" when he was faced with Vauban's 17th century fortifications strengthened and brought up to date by modern artillery and entanglements.



Spit Bank Fort. The sea forts were built of granite and roach portland stone to protect the ring of guns in casemates inside whilst turrets were to go on the roofs. The stonework was to be protected by iron armour plates hung on the outside, except on the portion of this fort looking towards the harbour mouth where the guns had only iron shields. By 1875 this fort had three 5" plates on top of one another and a fourth or more could be fitted. This iron armour was "soft" not "chilled or hard". If shot fired against it was too powerful it would lodge in the plate or penetrate but the plate would not shatter. As guns became more powerful more plates could be fitted. Hard armour was more resistent but once it yielded the whole plate often shattered creating a bigger gap.

EASTNEY FORT EAST

EASTNEY FORT WEST

LUMPS FORT

Views of the
'Sea Front Inner Line'

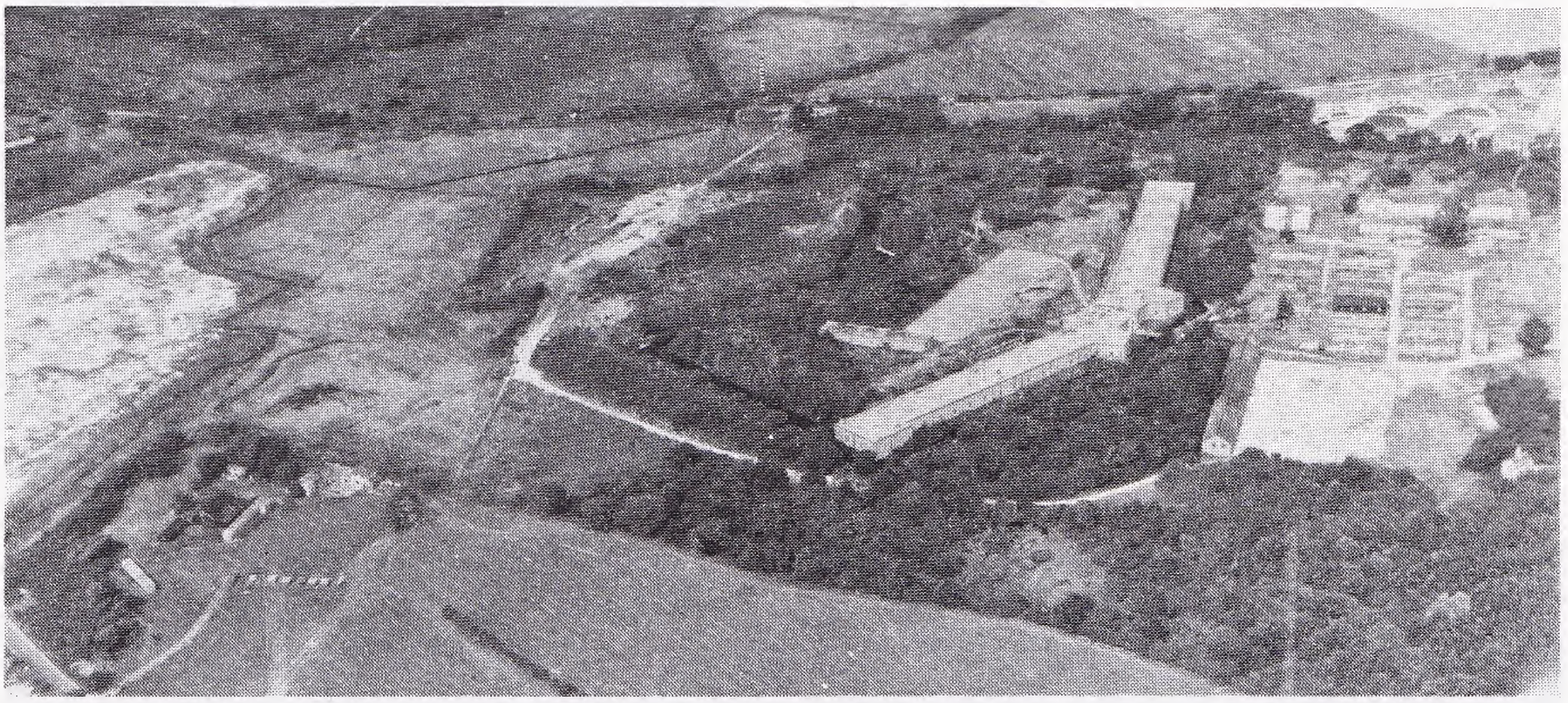
Eastney Fort West (and East off picture) with the Barracks formed one complex. Under shelling from sea the Barracks would have suffered but its predominance in the gun layers sight would undoubtedly have kept hits away from the batteries. A fact experienced at Alexandria in 1882 proves this. Barracks now contains Royal Marine Museum.

AEROFILMS PHOTO

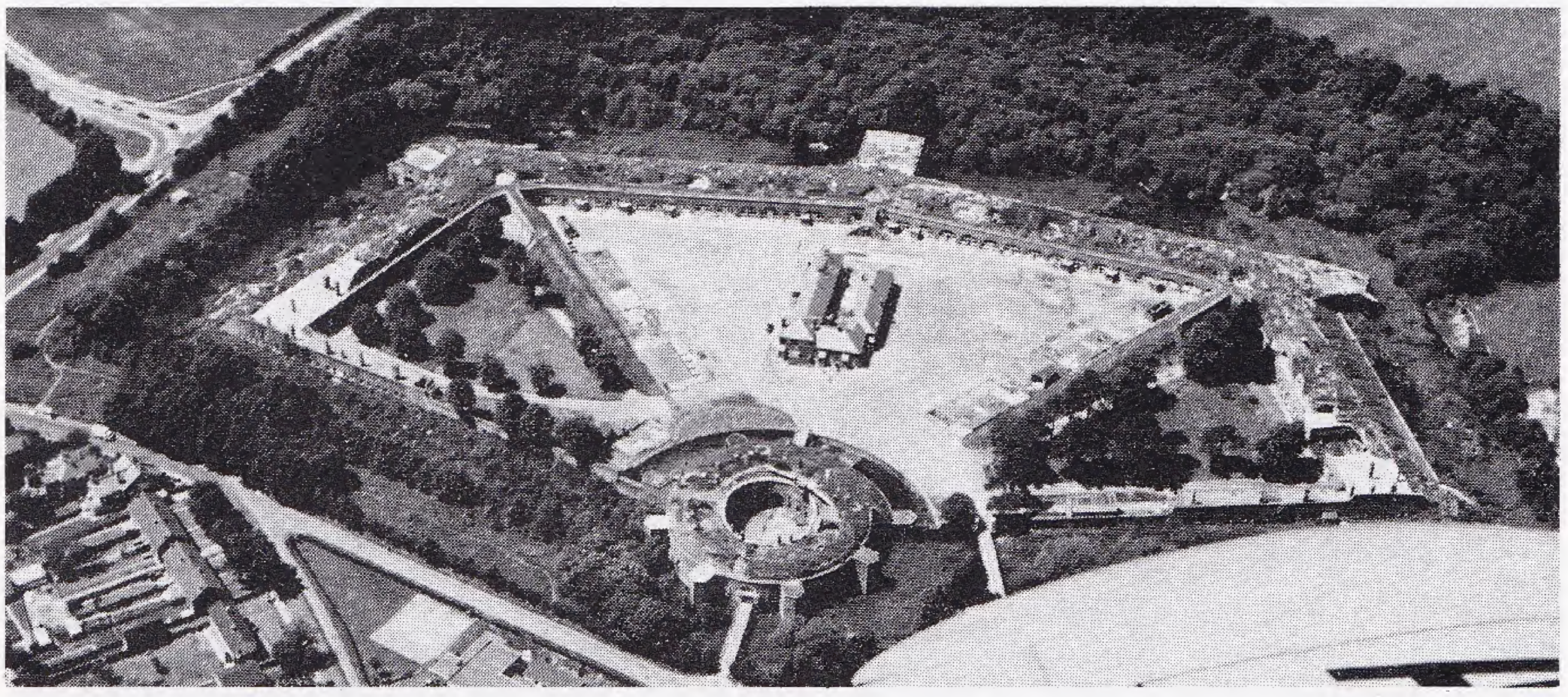
Eastney Barracks from the East.

AEROFILMS PHOTO

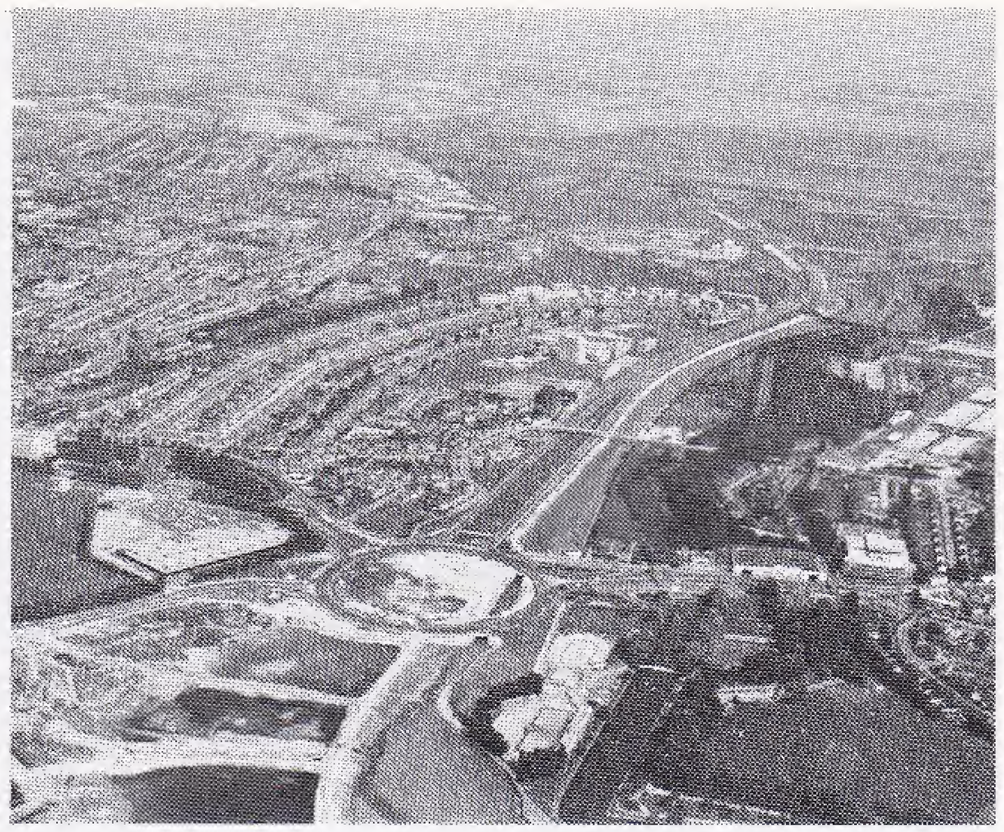
Fort Elson with provision for flooding the moat from the harbour. AEROFILMS PHOTO



Fort Gomer with wet ditch and defencible barracks.



Fort Brockhurst. The projections into the moat are caponiere which held guns to fire along the moat.
BY COURTESY OF THE NEWS, PORTSMOUTH

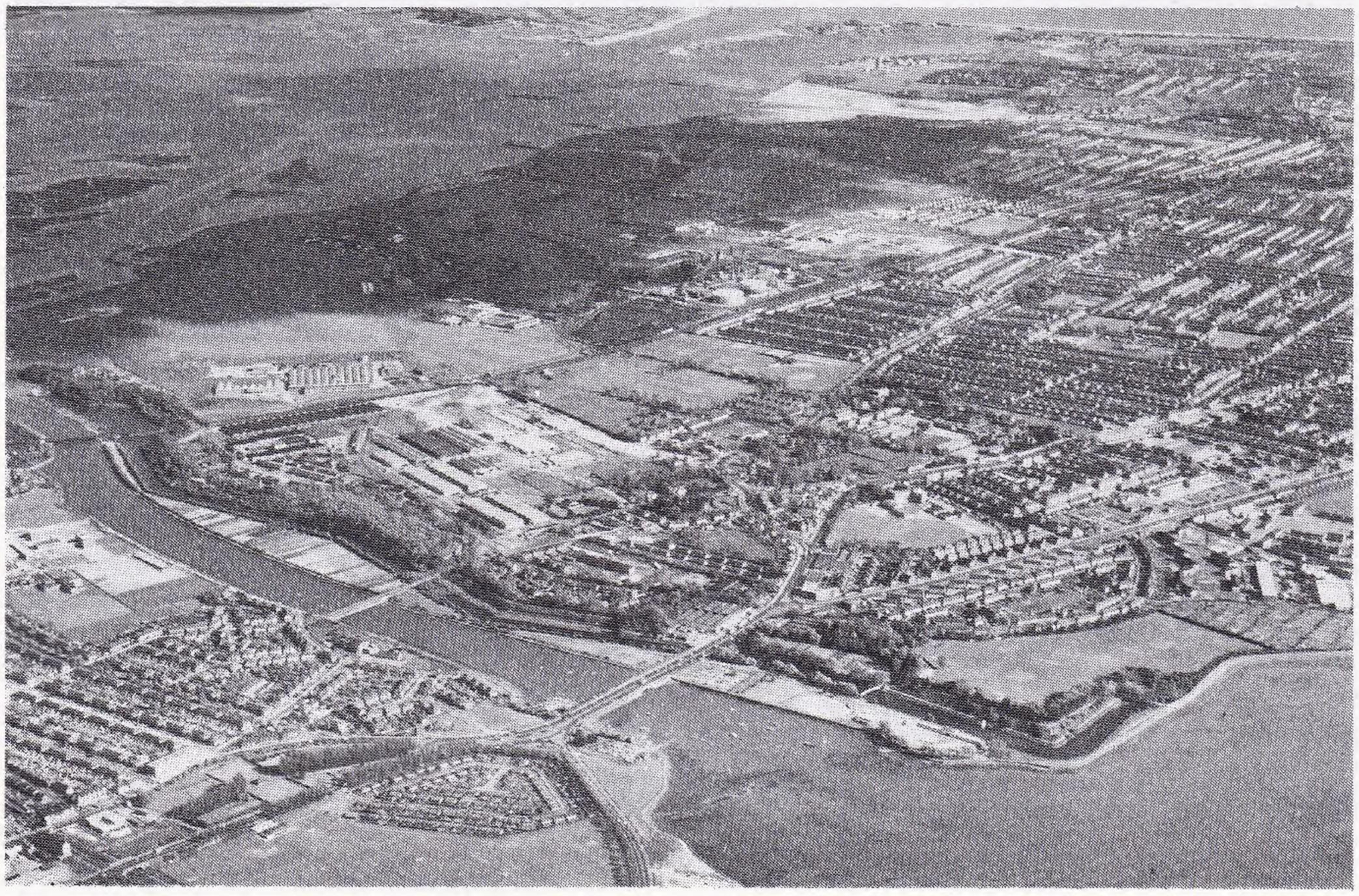


Left Above:
Hilsea Lines and Portsdown Hill. (with Chalk Pit)
AEROFILMS PHOTO

Right Above:
Hilsea Lines. The main channel was intended to allow gunboats to pass from one harbour to the other to take supporting fire to where it was needed.
AEROFILMS PHOTO

Right:
Hilsea Lines with Portchester Castle in middle distance. AEROFILMS PHOTO

Below:
Hilsea Lines. Note the flatness of Portsea Island with Hayling Island in the distance. AEROFILMS PHOTO



Land Front–Inner Line–Left Flank

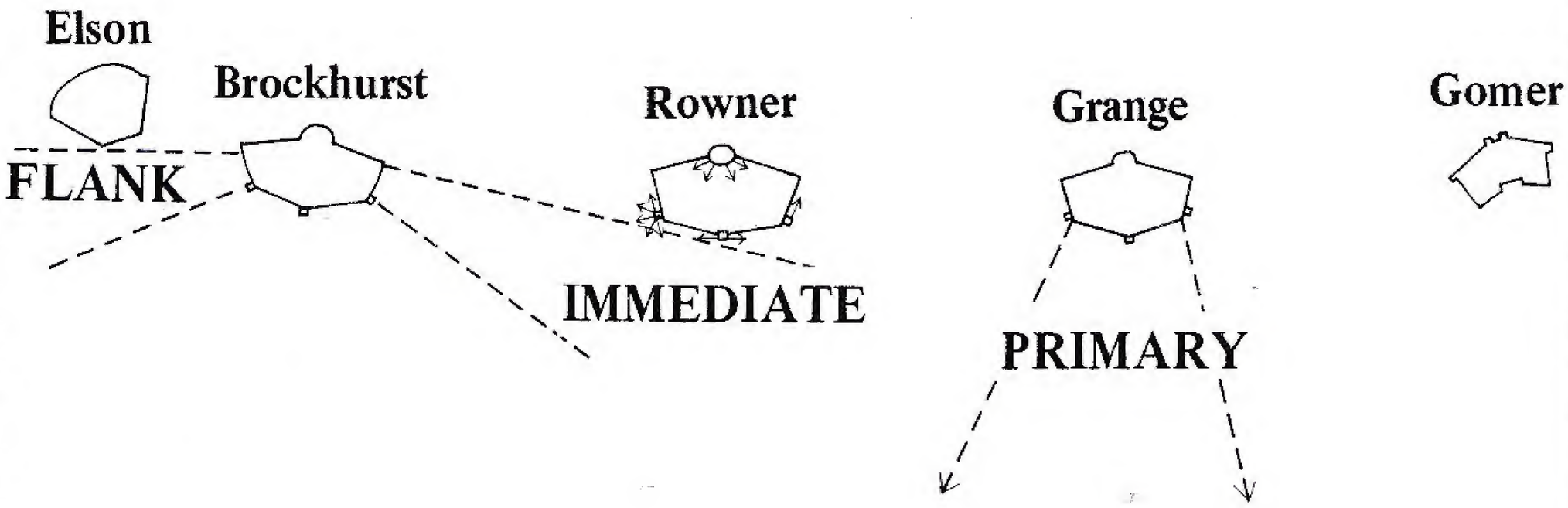
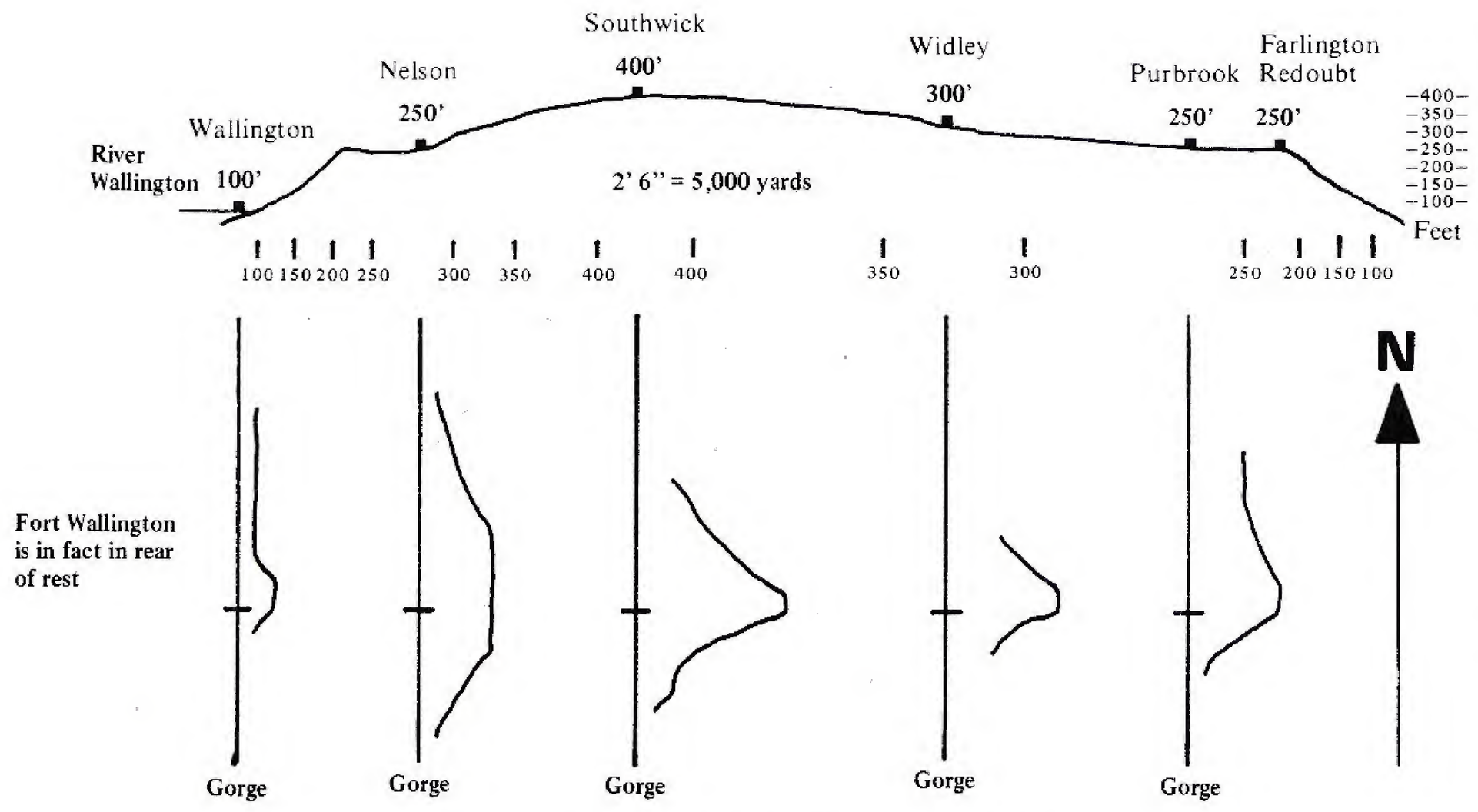
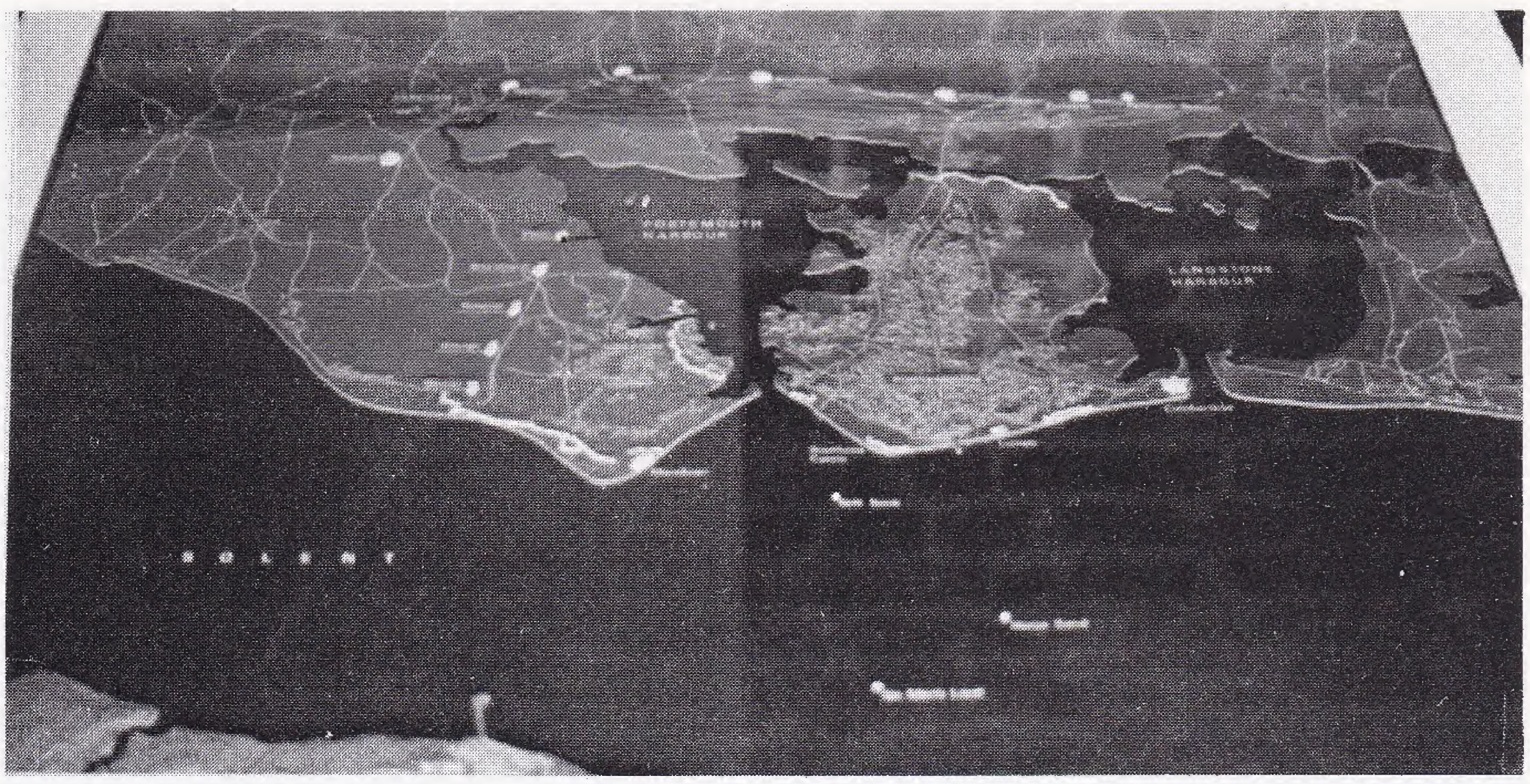


Diagram to show the three types of artillery mounted according to purpose and to show how the defence of one fort was assisted by the flank guns on the adjacent forts.

PORTSDOWN HILL SHOWING RELATIVE HEIGHTS AND GRADIENTS

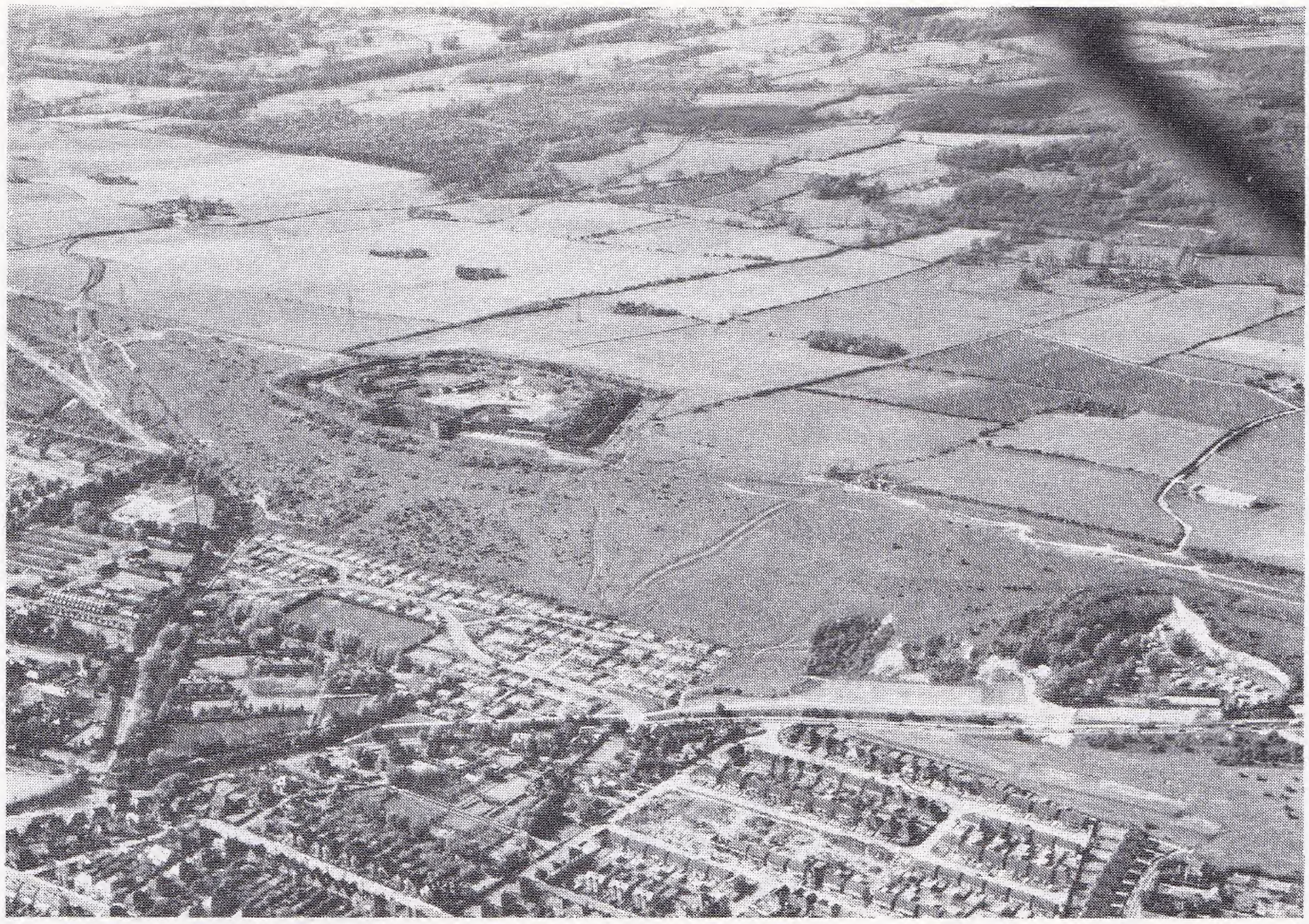


The cross sections show the gradient of the hill in front of and behind the Forts.



The sea front and land front inner and outer lines as completed. Crookhorn Redoubt and Ryde Sands Forts were discontinued and are not shown, neither are the two between Fareham and Stokes Bay.

Fort Purbrook and Langstone Harbour. End of Hilsea Lines. Fort Cumberland at the Harbour Mouth.
AEROFILMS PHOTO



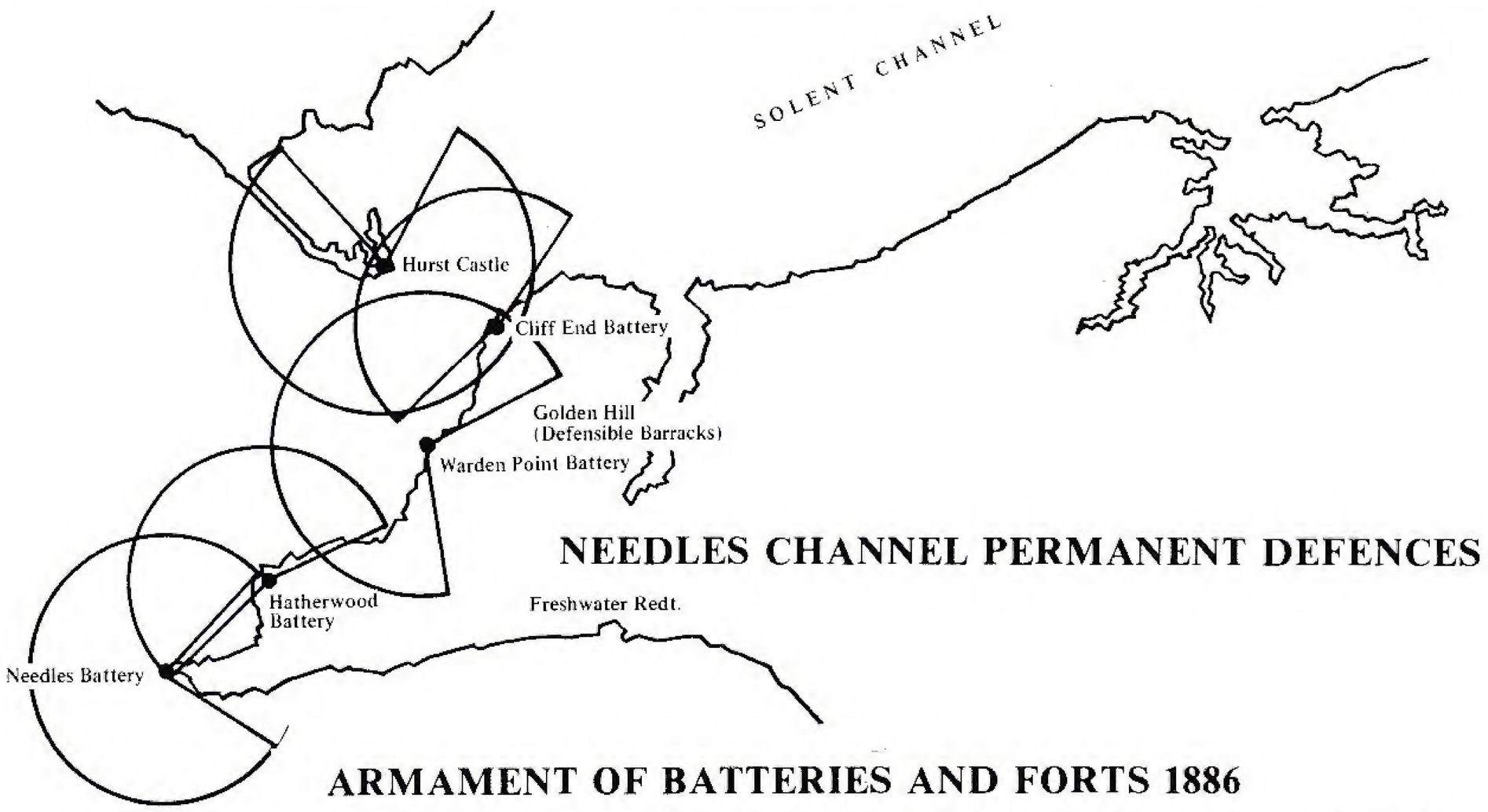
Fort Widley. The fort faces "North". It was not built round the wrong way. AEROFILMS PHOTO

Fort Purbrook. On the right flank. This fort had two outworks Farlington and Crookhorn Redoubts to cover "dead ground". AEROFILMS PHOTO

THE DEVELOPMENT OF ARTILLERY

From 1860 until the Entente Cordiale in 1904 was a period of great change in gunnery. This concerned mainly how the guns were loaded. The following summarises the position.

Type of Weapon	Where Loaded	Whether having Spiral Grooves called Rifling
Cannon and Mortars	Front end i.e. At the muzzle	No
The Rifled Breech Loader, Armstrong, or Screw Gun (RBL) (alternate names)	At the rear end i.e. Breech Loaded	Yes
Rifled muzzle loaders (RML)	At the muzzle	Yes
Breech loaders (BL)	At the breech	Yes
Quick firers (QF)	At the breech	Yes

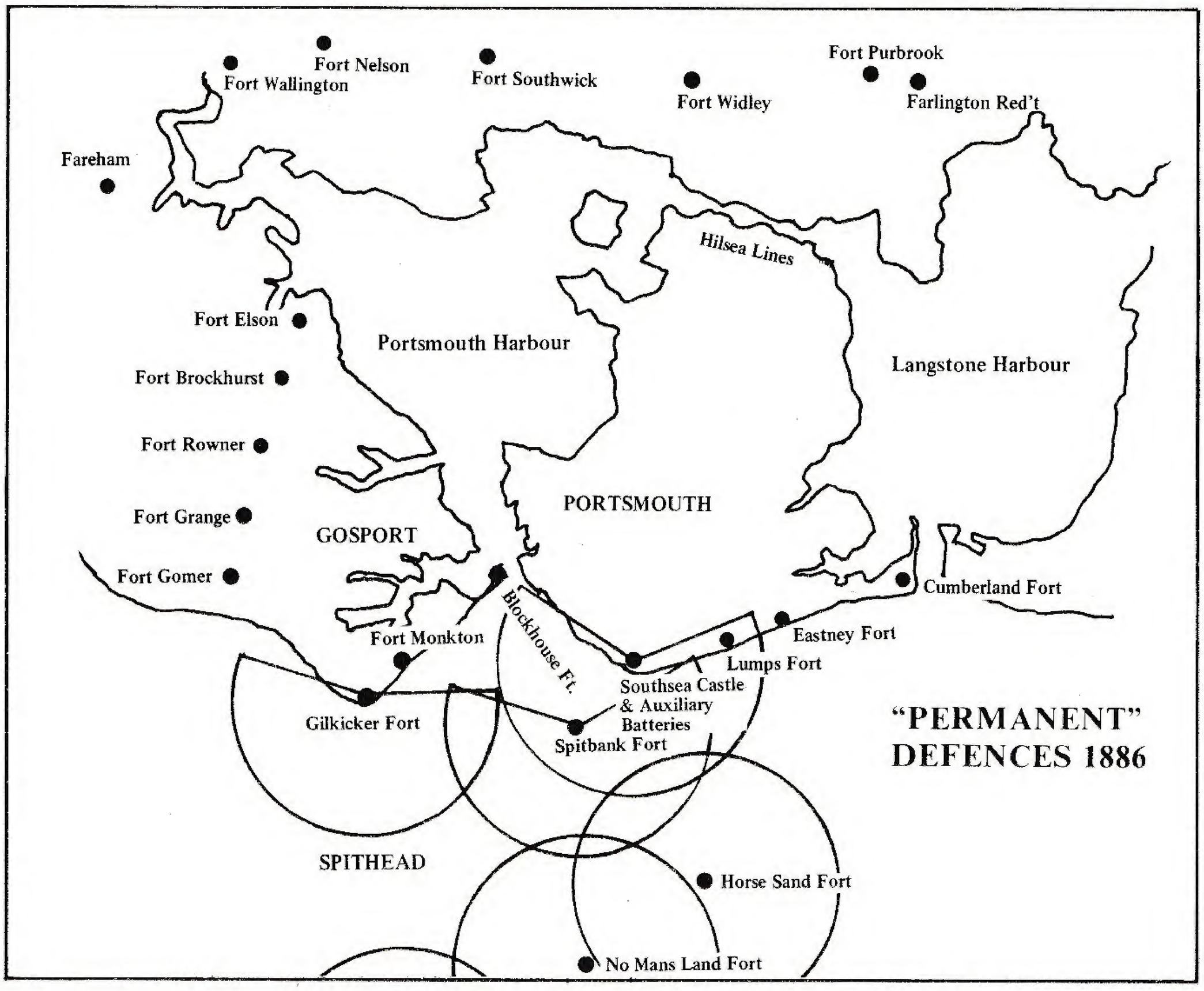


NEEDLES CHANNEL PERMANENT DEFENCES

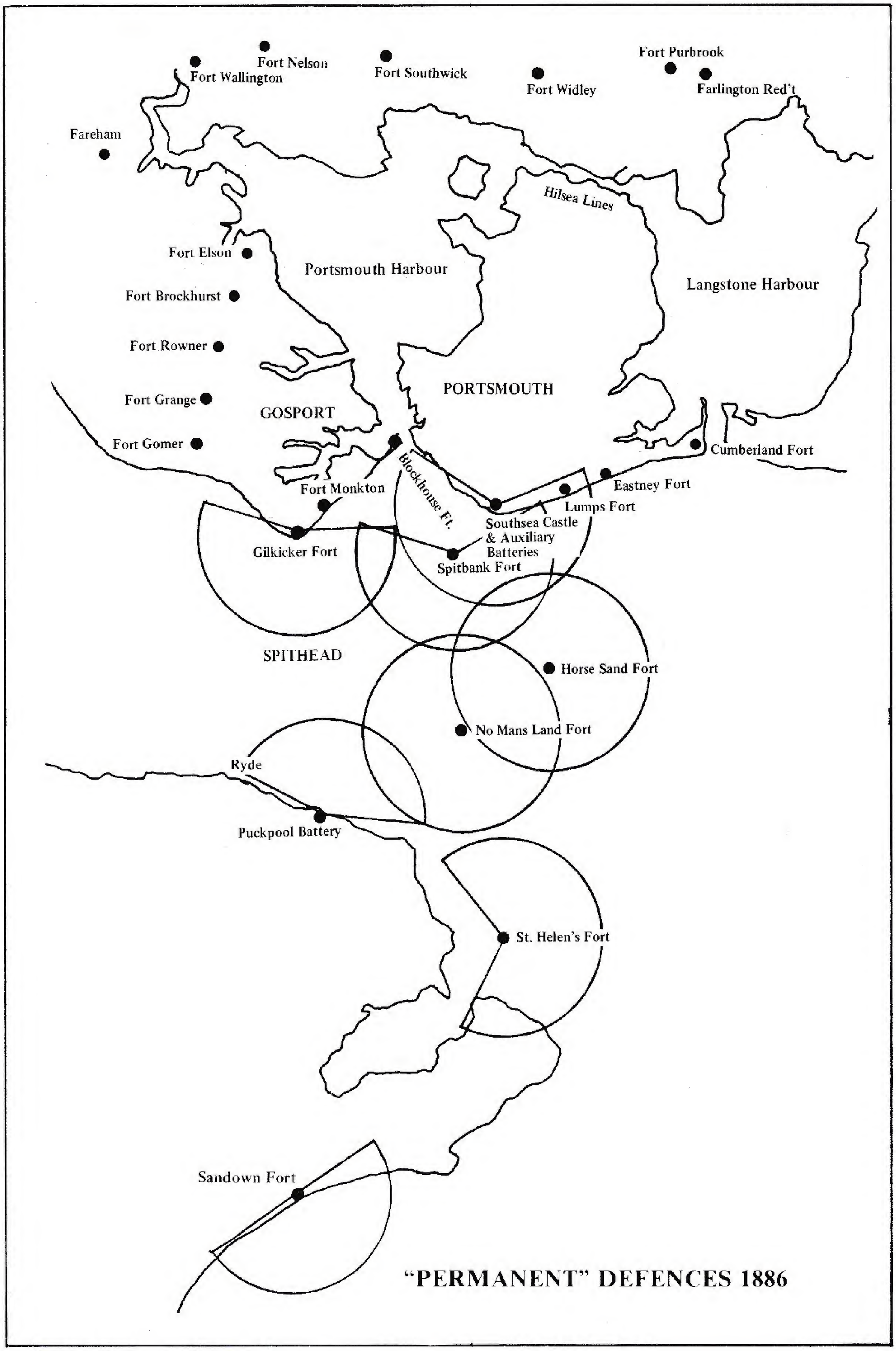
ARMAMENT OF BATTERIES AND FORTS 1886

	Smooth Bore	Rifled Breech Loaders	Rifled Muzzle Loaders	Breech Loaders
CLIFF END BATTERY			6 x 12.5″ 3 x 10″	
FRESHWATER REDOUBT	3 x 8″ Howitzers	2 x 7″	2 x 64 PDR	
GOLDEN HILL (Defensible Barracks)		6 x 40 PDR		
HATHERWOOD BATTERY			2 x 12.5″ 4 x 9″	
HURST CASTLE			12 x 12.5″ 18 x 10″ 5 x 9″ 6 x 64 PDR	
NEEDLES BATTERY			6 x 9″	
WARDEN POINT BATTERY			8 x 9″	

With cannon it is obvious where the ball is put in and a hand inside the barrel will show that it is smooth. This was the main weapon used up until 1860 not only on the world's ships but also its fortifications. In 1859 Sir William Armstrong produced a new gun which could be loaded from the rear into a breech; these guns had spiral grooves in the barrels which gripped the projectile as it passed through and rotated it so that it spun through the air and the spinning made it more accurate in use. This weapon was a great scientific breakthrough but it was too far in advance of the "state of the art". The breech was closed by a wedge dropped into the channel through which the shell had been loaded whilst the wedge was held in place by a large screw being tightened. The problems of expansion of metal caused jamming with this gun and the rapid issue of it to the fleet acted against its own interests leading to a loss of faith and its withdrawal in 1864 after the action at Kagosima where there were 28 accidents involving 365 rounds from 21 different guns on 5 ships. It is difficult to estimate in the long run how great the damage was in our failure to persevere with breech loaders after these initial setbacks because this same gun with modifications continued in service until shortly before the first world war. The gun which replaced the RBL or Armstrong gun, so unsuccessful at Kagosima, had the same calibre, seven inches and was also rifled but was loaded from the muzzle. This change meant that in a fortress the rammer again had to be greatly exposed whilst loading but the "Rifled Muzzle Loader" was capable of development to great size, the largest calibre being 17.72 inches, and above all was safe so that in 1868 when



"PERMANENT" DEFENCES 1886



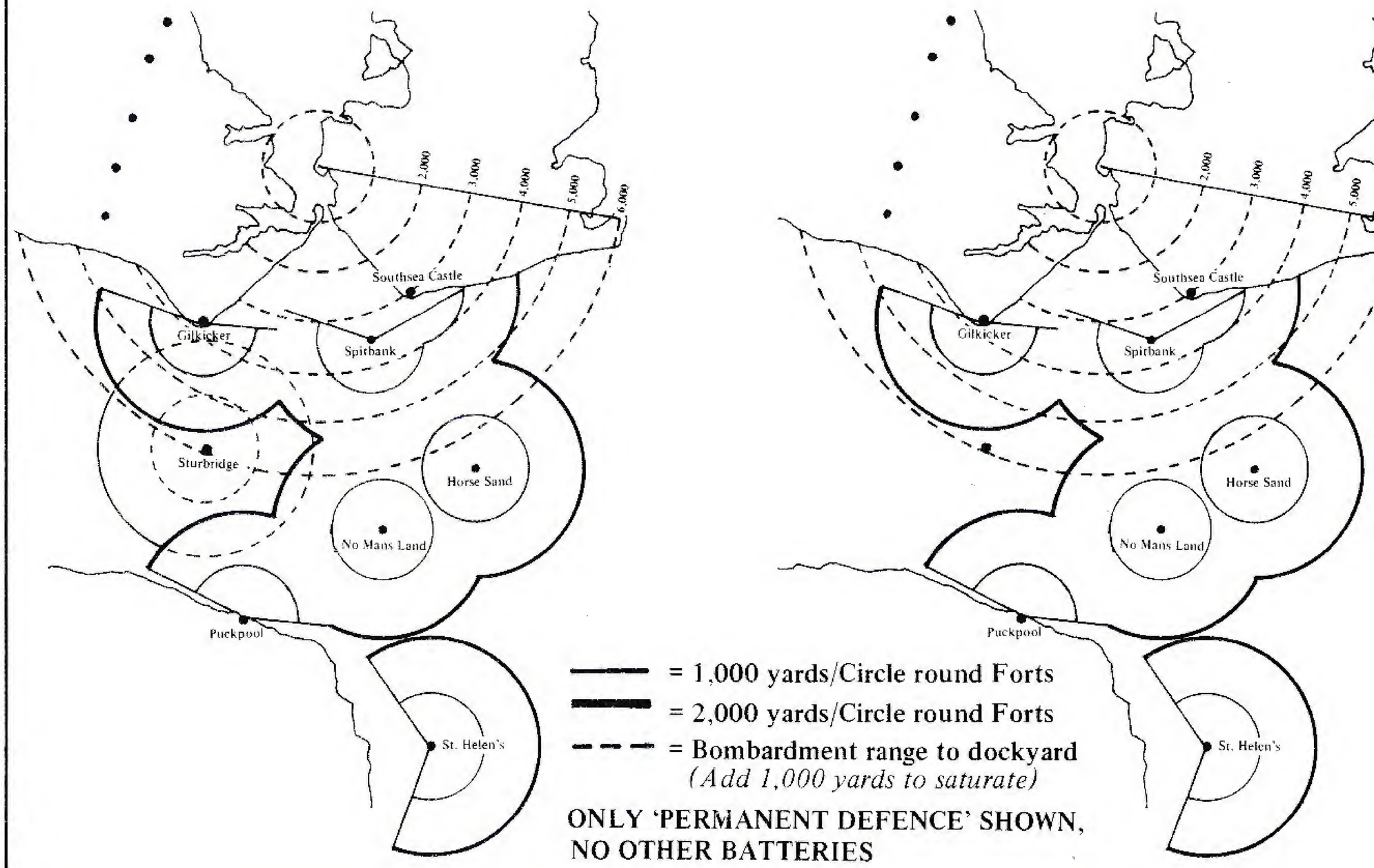
"PERMANENT" DEFENCES 1886

ARMAMENT OF BATTERIES & FORTS 1886

Immediate Defences	Sea Front Inner & Outer Lines	Land Front Inner Line	Land Front Outer Line	Sandown Bay	Smooth Bore	Rifled Breech Loaders	Rifled Muzzle Loaders	Breech Loaders
				Bembridge		6 x 7″		
	Blockhouse				2 x 8″		11 x 64 PDR	
		Brockhurst			13 x 8″ 4 x 13 mortars	16 x 7″	4 x 64 PDR	
	Cumberland				12 x 8″	1 x 7″	15 x 64 PDR	
	Eastney Fort East Eastney Fort West				10 x 8″		14 x 64 PDR	
		Elson			3 x 13″ mortars	18 x 7″		
			Fareham					
			Farlington Redoubt			3 x 7″	5 x 64 PDR	
	Gilkicker				7 x 13″ mortars		2x 12″ 3 x 11″ 10 x 10″ 5 x 9″	
		Gomer			2 x 13″ mortars	20 x 7″		
Gosport								
		Grange			13 x 8″ 4 x 13″ mortars	16 x 7″	4 x 64 PDR	
		Hilsea						
	Horse Sand					12 x 10″	10 x 12.5″	1 x 12″
	Lumps Fort					1 x 40 PDR 3 x 7″	1 x 7″ 11 x 64 PDR	
	Monckton				11 x 8	5 x 7″	6 x 64 PDR	
			Nelson			3 x 7″ 1 6.6 howitzer		
	Nomansland						12 x 12.5″ 12 x 10″	
Portsmouth					2 x 13″ mortars 11 x 12 PDR	3 x 7″	14 x 80 PDR 3 x 64 PDR	
	Puckpool				30 x 13″ mortars		4 x 11″	
			Purbrook			1 x 7″		
				Redcliffe			4 x 64 PDR	
		Rowner			13 x 8″ 4 x 13″ mortars	16 x 7″	4 x 64 PDR	
				Sandown Barrack Battery			5 x 64 PDR	
				Sandown Fort			4 x 9″ 8 x 10″	
	St. Helens						1 x 12.5″ 2 x 10″	
			Southwick					
	Southsea Castle & Auxilliary Batteries						8 x 7″ 13 x 9″ 1 x 11″ 3 x 64 PDR	
	Spitbank						6 x 7″ 9 x 10″	
	Stokes Bay Lines				12 x 8″	25 x 7″	2 x 64 PDR	
			Wallington			4 x 7″		
			Widley		8 x 32 PDR S.B. Breech Loaders		10 x 7″ 2 x 8″ Howitzers 5 x 6.6″ ,, 4 x 64 PDR	
				Yaverland			8.64 PDR	

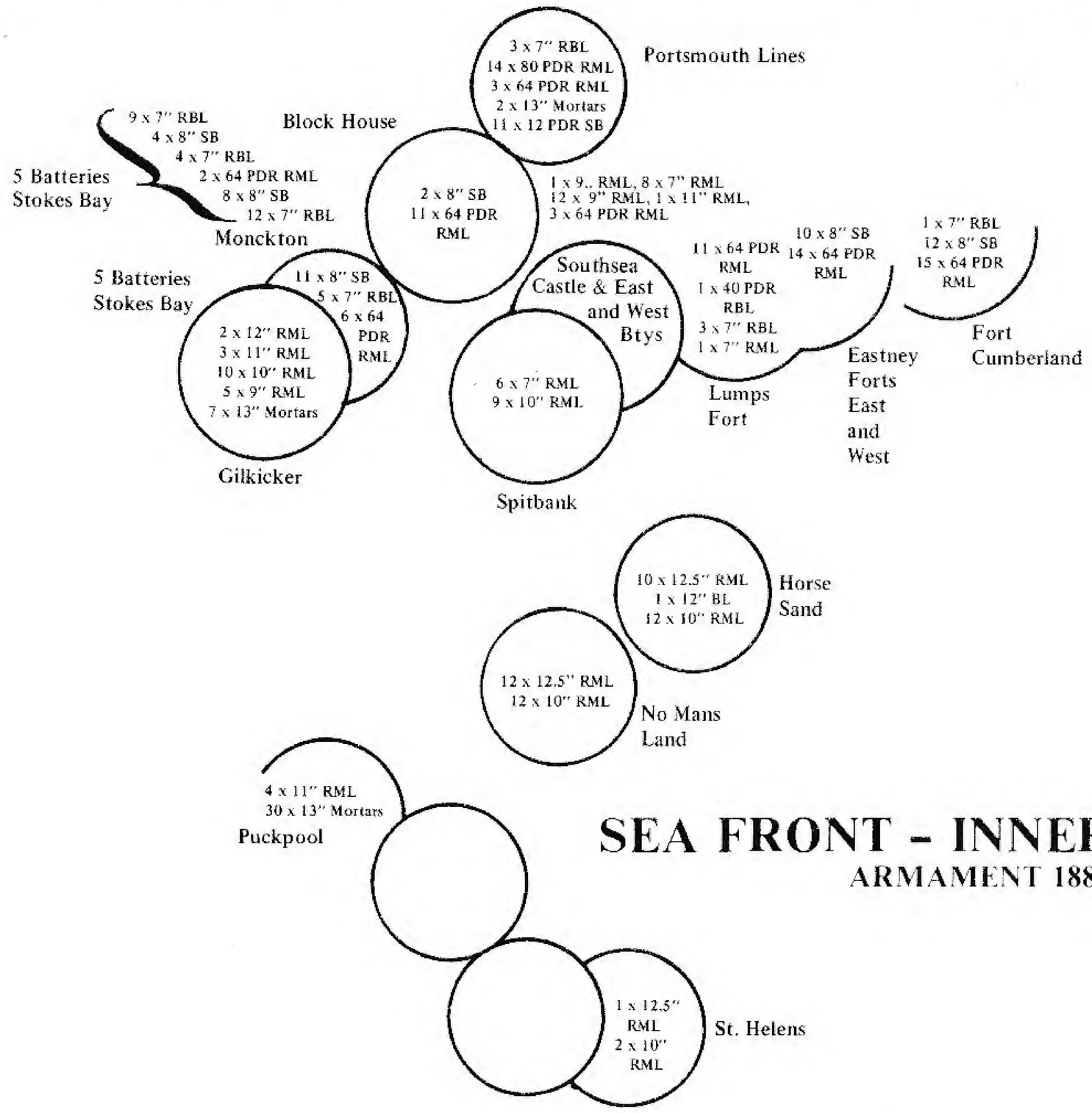
The above excludes stocks of "reserves" moveable armament, minefield and machine gun protection.

Diagrams illustrate concentration of fire at 1,000 and 2,000 yards range over the bombardment area with and without the Sturbridge Fort which was planned but could not be built due to foundation problems.



recommendations for a return to breech loaders were made by an Ordinance Select committee the admiralty would not agree. They were aware that the French who had retained breech loaders were still having difficulties with closing the breech and with safety and were achieving a slower rate of fire. It was however the French invention of the "interrupted thread" method of closing the breech which was adopted by the British and led the return in 1879 to "Breech Loaders" with a new 12 inch naval gun. Only the readoption of breech loading permitted full benefit of the new slow burning powders with the greater velocity they gave and the penetration power which this produced. The importance of the "Quick Firers", which were breech loading guns of six inch calibre and less, was that the projectile and the charge were like a bullet, manufactured, stored and loaded as a single item whereas the larger breech loading guns were loaded with separate projectiles and individual bagged charges. Ammunition which could be loaded in one piece allowed a very high rate of fire and in coastal defences the quick firers gave the gunners a reasonable opportunity of putting sufficient shells into the air at one time to give a reasonable chance of hitting some of the new torpedo craft and fast cruisers which caused so much thought in the early 1890's.

The term "High Angled Fire" was concerned with attempts to perforate the armoured raft deck of war ships by plunging fire which would put an armour piercing projectile into the vital areas of a ship without having to go through the much thicker side armour. It was proved that modification of 9" RML guns produced a weapon capable of putting a shell over 350 pounds in weight onto a target from a considerable height and achieving a good degree of penetration. This type was fitted at Fort Cumberland.



SEA FRONT – INNER & OUTER
ARMAMENT 1886

THE INTERPLAY OF ARMOUR, ARTILLERY AND AMMUNITION

Ammunition in its simplest division is either ship/structure killing or man killing. During the Napoleonic wars the strength of the three decker wooden line-of-battle ship was that once provisioned, armed and crewed it could operate away from harbour for many months. Little that went wrong required dockyard assistance in normal circumstances and therefore it was possible to maintain the close blockade of enemy ports with the long periods at sea it entailed. From 1815 for over thirty five years this type of ship remained supreme although steam, the steam paddle and finally propulsion by propeller arrived and merchant ships were already being constructed in iron. Under attack wooden ships had seldom been sunk by gun fire; losses had been by fire, boarding or bad weather whilst operating close inshore. Crew casualties between decks were more often caused by flying splinters from the timber work or debris after impact by cannon balls which were solid and did not fragment or explode rather than by direct hits from shot itself. Men on the upper deck were, of course, less protected and therefore susceptible to attack by smaller missiles such as musket balls or grape shot. The important fact was range. Successful attack meant finally putting the ship close alongside the enemy when various ploys were used, such as double shotting, to smash up the enemy internally by means of the solid shot. The advent of shells which pierced the wooden sides and exploded amongst the crews of the guns lined up along the ships' sides, as they are to this day on the Victory, changed tactics over night. Now it had become possible to "lay off" and smash at long range and there was less need for superior seamanship to get alongside as before, the French were delighted. The shells were still ship smashers however

rather than sinkers.. The French decided that the answer to shell guns, which they quickly adopted, was to keep the shells out by iron sheets over the whole of a ship and in 1859 the Gloire was launched with a hull clad in 4″ plates over the whole of its length. The British response, the Warrior, had 4½″.

If we pause and consider a few other points there are the following:- The more weight placed on a ship the greater its draught, the slower its speed will be and eventually it becomes top heavy and capsizes assuming that the engine power and other factors remain unaltered. From the time the Warrior was launched with thicker armour ship designers were faced with finding compromises between the best places for putting the armour to protect the engines, guns, water line and crew without making the ship top heavy, slow or susceptible to a single knock out blow whilst trying to carry bigger or more powerful guns than the enemy. Gun designers knew that thicker armour needed more powerful guns to penetrate it and the guns they produced to do the job meant more weight for the ship designer to fit into his vessel. La Gloire was armoured along its whole length, Warrior amidships only. The unarmoured ends helped the designer carry more armour in the centre.

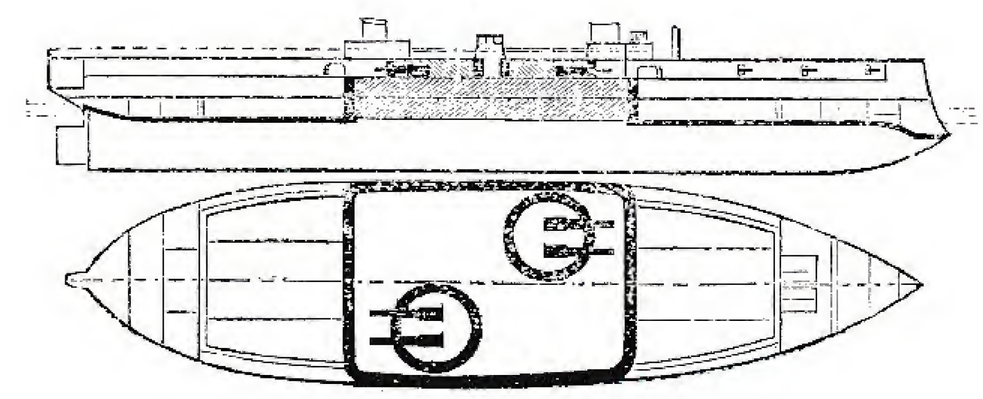
By 1872/73 the last British battle ship to have over all armour as a true iron clad had been laid down (the Dreadnought) and opinions in Europe were divided as to how the thicker armour now necessary was best distributed to avoid the total ruin of a ship by fundamental injury to her boilers, engines, magazines or floating power, attacks on such parts often being called Primary or Belt attacks, or even the ships immediate destruction because now true "ship killing" ammunition existed.

The English Plan

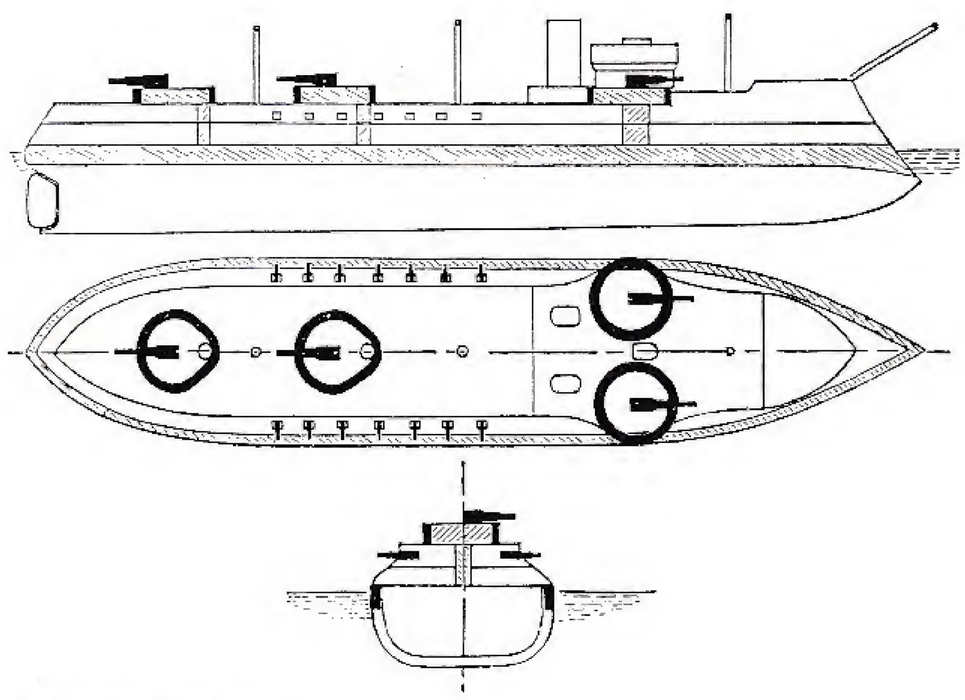
Strongly protected amidships, ends without vertical armour, lower parts and floating power protected by horizontal armoured deck (Inflexible 1881).

The French Plan

Complete armoured belt at the water line from stem to stern as well as horizontal armoured deck. (Amiral Duperré 1879).

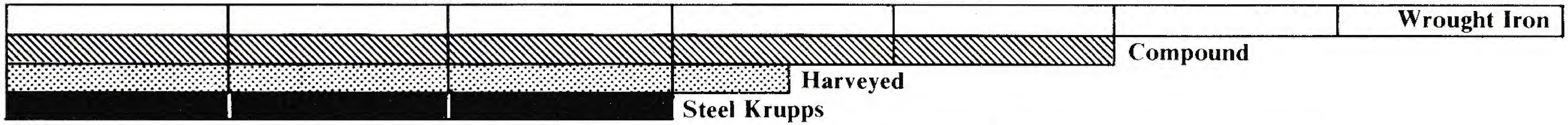


Inflexible



Amiral Duperrè

The English argument was that the French protected too little space with armour at the ends; the French believed too much buoyancy could be lost by penetration of the unarmoured portion or that a disproportionately large amount of damage could be done by a very small projectile entering easily as could happen with the English ships. From 1859 to 1881 British gun sizes increased from 8″ to 17.72″; from muzzle loading to breech loading and back again to muzzle loading and were in the process of returning to breech loading once again to obtain greater velocity for their projectiles. Armour had been wrought iron (very pure iron) and cast iron but steel was already proved as the most resistant metal although not totally acceptable for other reasons. All the



Comparison of penetration at 1,000 yards by same 7″ gun. Rule of thumb basis. Higher calibres in proportion.

SB

12 Pounder
18 Pounder
24 Pounder
32 Pounder
68 Pounder
8″ GUN

Wooden Walls — Timber

Victory — Laid Down 1759

Duke of Wellington — 1852

RBL

6 Pounder RBL
9 Pounder RBL
10 Pounder RBL
12 Pounder RBL
20 Pounder RBL
40 Pounder RBL
70 Pounder RBL
7″ RBL

First with RBL's — Ironclad Wrought Iron — Wrought I. / Timber

Warrior — 1859

Bellerophon — 1863

RML

2.5″, and 7
9, 10, 13, 16, 25, 40
& 64 Pounders RML

6.6″	RML	7 tons
7″	RML	7 tons
8″	RML	9 tons
9″	RML	12 tons
10″	RML	18 tons
10.4″	RML	28 tons
11″	RML	25 tons
12.5″	RML	38 tons
16″	RML	80 tons
17.72″	RML	100 tons

First with Compound Armour — Compound Armour — Steel / Wrought I.

Inflexible — 1874

Last with RML's — Ajax — 1876

BL

10 Pounder Gun
12 Pounder Gun
15 Pounder Gun
30 Pounder

4″	BL	Gun
5″	BL	Gun
6″	BL	Gun
7.5″	BL	Gun
8″	BL	Gun
9.2″	BL	Gun
10″	BL	Gun
12″	BL	Gun
13.5″	BL	Gun
16.25″	BL	Gun

First British with BL's — Edinburgh — 1879

First with 16.25″ BL — Benbow — 1882

1st with Secondary QF's — Trafalgar — 1886

1st with H'd Steel — Harveyed Steel — Face Hardened Steel — Royal Sovereign — 1889

1st with Steel — Empress of India — 1889

1st with 360° loading positions for Main Guns — Steel Krupps — Barfleur — 1890

By 1900 Four Gun and Armour types still served together.

while there was the need for better guns to penetrate the improved armours and even stronger armour to restore the advantage its advent in 1859 had brought. The chart summarises the position and is intended to draw attention to the multiplicity of weapons, armour, degrees of protection and ammunition used, often simultaneously, over little more than fifty years.

In the Portsmouth area many of these guns were mounted to provide a great amount of fire power where it was necessary e.g. over the "Sea Front" area where the water surface was over five hundred and forty nine million square feet and had to be covered whilst the surface area of a battle ship was about twenty thousand square feet and its side area little different. In addition to quantity for fire power the guns provided were capable of penetrating the armoured belt in a primary horizontal attack, others of penetrating a raft deck of armour by plunging fire whilst there were also those for smashing up the non or lightly armoured areas. By the 1890's it was becoming accepted that a capital ship could be rendered useless by destroying its unarmoured secondary areas although the main belt or raft deck had not been penetrated and this attitude was reflected in the adoption of the larger calibre quick firers. All of these guns were supplemented in parts of the fortress area by mine fields controlled from the shore, machine guns and in one instance by wire guided torpedoes. As new guns were evolved they were incorporated in the defences and replaced older pieces whilst their versatility was extended by the different ammunition designed.

RELATIONS WITH FRANCE 1860-1904

It might be argued that as no war broke out with France during this period the defences were pointless and were folly and it is necessary to put this into perspective. In July 1870 Napoleon III's army went to war against Prussia and the streets of Paris were filled with cries of "à Berlin" by Frenchmen sure of the invincibility of France and of her certain victory. On the 19th July the British Prime Minister Gladstone was given by Prussia details of a Franco/Prussian agreement in which part of the terms were to allow France to have Belgium. Britain prepared immediately to send 10,000 men to take Antwerp and for war with France and it took three weeks of negotiations with France and Prussia before Britain extracted treaties guaranteeing the neutrality of Belgium and cancelled the operation. During those three weeks parliament voted a further 20,000 men for the army and two million pounds for the services. Even after her disastrous defeat in the hands of the Prussians the French significantly put large schemes of naval construction in hand and although partisan opinions militated against a coherent policy the French strength was impressive. Significantly Russia was also building strong vessels. In 1878 Britain offered support to the Sultan of Turkey, who was under attack from Russia, we moved troops from India to the Mediterranean, called out reserves, voted extra money for the armed forces and purchased additional ships for the navy. The "Belle Isle", "Orion", "Superb" and "Neptune" at that time being built in British yards for Turkey and Brazil. This was the beginning of a pattern of hasty purchasing of ships to meet long obvious deficiencies which has continued ever since and started at a time when only four battle ships were on Channel duty and only twelve were in commission in United Kingdom waters. Only a short time afterwards, with Portsmouth's population standing at 127,000 odd, relations were further strained by our unilateral action in bombarding Alexandria and subsequent occupation of Egypt to the exclusion of French interests. In 1888 came a report following the naval

manoeuvres of that year emphasising that Great Britain, whose maritime supremacy was her life, was very far from being as strong as she should have been on the seas, either in personnel or material compared to France. The three admirals who reported were decidedly of the opinion that no time should be lost in placing our navy beyond comparison with that of any two powers. This marked the beginning of the phase when British policy was for the navy to be equal in capital ships to the combined strength of her next two nearest rivals. It came in the latter part of a century which had shown French leadership in so many aspects of military and naval thinking, and which in these later years had shown a French lead in the early adoption of armour for ships, of smokeless powder for small arms, of balloons for military purposes, of torpedoes in actual operation and before the turn of the century was to see the introduction of melinite high explosive and the famous "75" field gun. It was only the replacement of France by Germany in the position of greatest fear which that country had held in our minds for so long which led to a reconciliation between Britain and France. When war with Germany came their ships bombarded various points of the English Coast but never fortress Portsmouth or any of the other fortress areas.

AMMUNITION

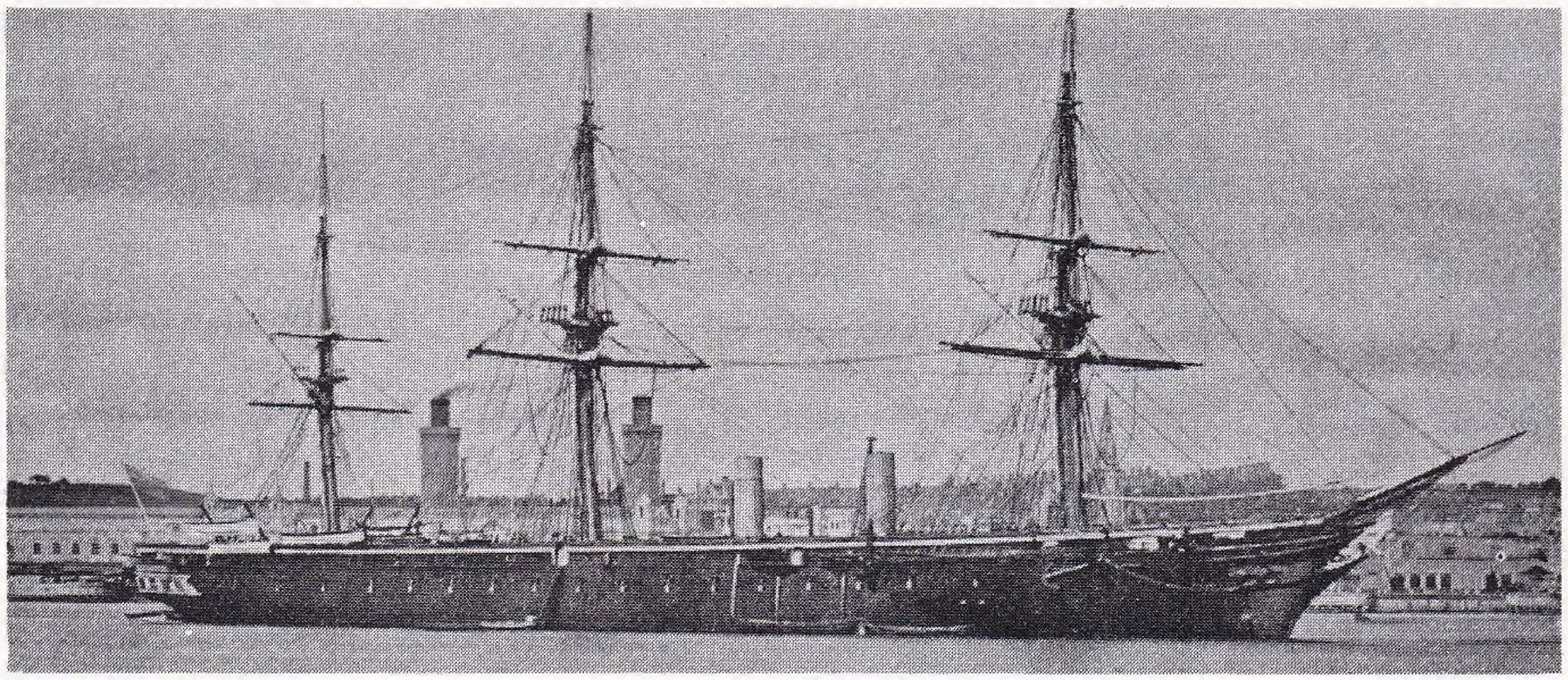
TYPE	WHAT IT IS	EFFECTIVE RANGE	USE AND EFFECT
CANISTER SHOT	A hollow cylinder containing a bursting charge and small balls.	0-300 yards	BANG — Cone of Musket Balls thrown forward against infantry.
CASE SHOT	A weak envelope filled with bullets, **no bursting charge,** breaks up on impact	300/400 yards onwards	Impact — Cone as above
GRAPE SHOT	Iron spherical shot put up in stands of three. Much used on board ship.	0-300 yards	Cone created on break up of stands
SHRAPNEL	Designed to have the same effects as case or grape but for longer ranges still. Hollow projective with bursting charge in base.	1000-2000 yards	Airburst 60/80 yards before target. Cone thrown forward but not greatly dispersed.
ROUND SHOT	Spherical balls of iron.	0 – 2000 yards	Really a very close range projectile and the main anti ship projectile until shell was introduced.
COMMON SHELL	A projectile which bursts as a result of a nose or base fuse and scatters as pieces. The shell is not weak and could penetrate structures without breaking up. When Lyddite high explosive was used as the burster from 1898 the explosion gave off a noxious gas. Used at greater ranges than canister, case or shrapnel; may burst on impact, (percussion fused) after set time (time) fused or may carry both fuses.	Ranges above shrapnel. This the ship smashing projectile Par Excellence.	Projects pieces in all directions including backwards – most effective to right and left of burst.

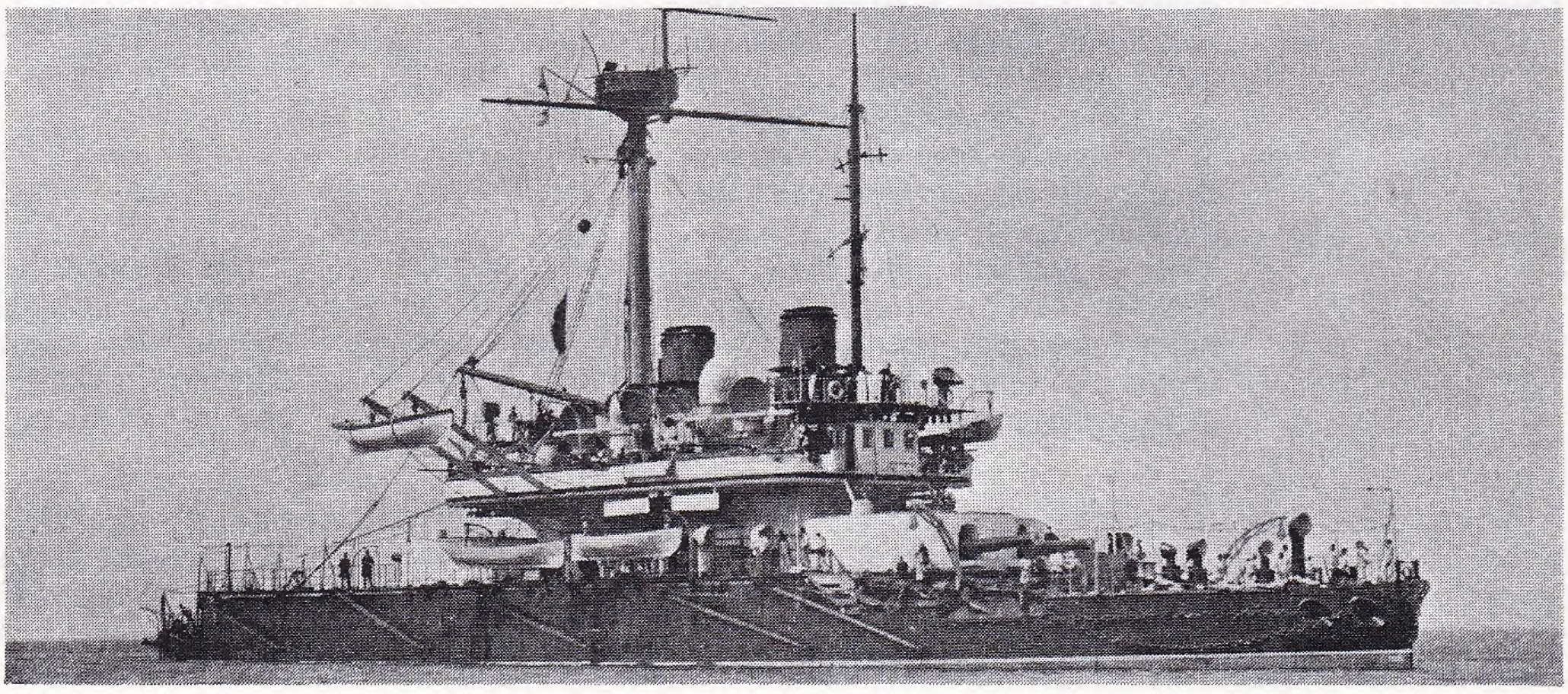
The ability of the shell to penetrate structures/ ships sides was important as armour was used to keep shells out or to limit their effect within. The bursting charge was changed from gunpowder to high explosive (three times as effective) and shells made stronger, hence armoured piercing shells. There was also armour piercing shot for the attack of very heavy armour but although "shot" normally implies solidity these could have a base fitted burster.

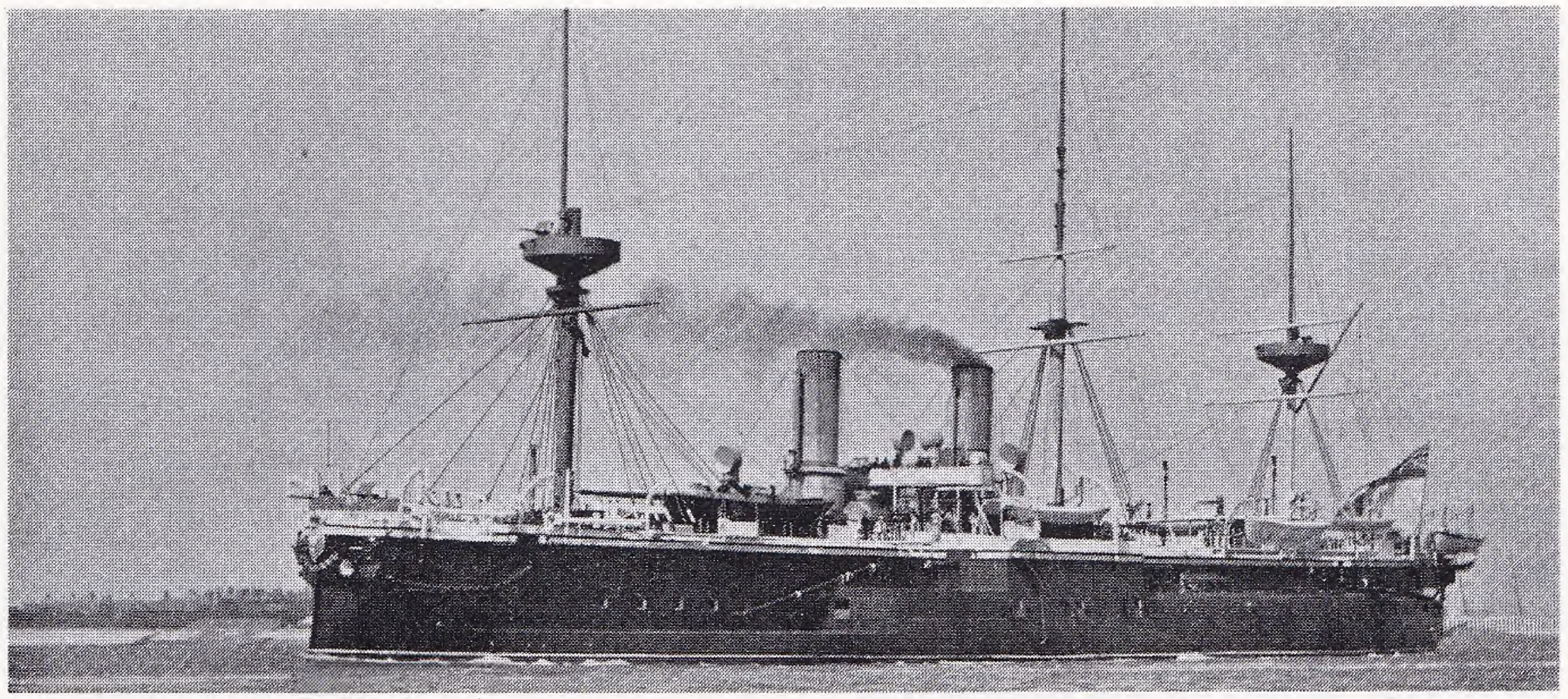
Left: H.M.S ST. VINCENT
Ship of the line laid down 1805, launched 1815. When stationed at Portsmouth 1859 carried 46 guns. Never converted to steam. When laid down was variously classed as a 102 or 120 gun ship.

Centre: H.M.S. WARRIOR
Britain's first ironclad, laid down 1859 and completed 1861 with 26 68 pounder smooth bores, 10 110lb (7") R.B.L., 4 70 pounder R.B.L. Now exists as a coal hulk.

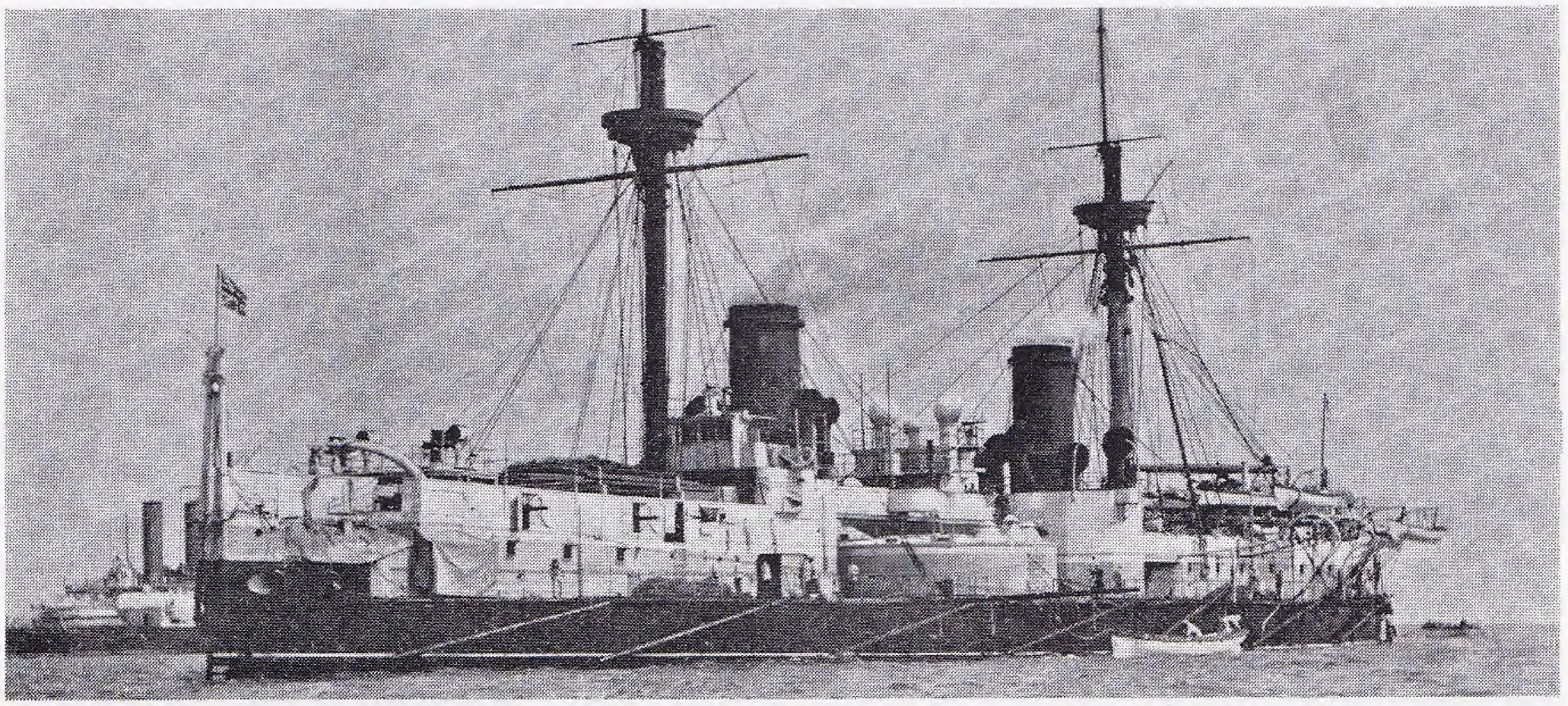
Bottom: H.M.S. THUNDERER
Laid down 26.6.1869 with "Devastation". First sea going "Mastless". Turret ships and first of the Quasi Monitor type. 2 12" 38 ton R.M.L. and 2 12.5" 38 ton R.M.L. guns. Seen here rearmed with 4 10" B.L. guns.



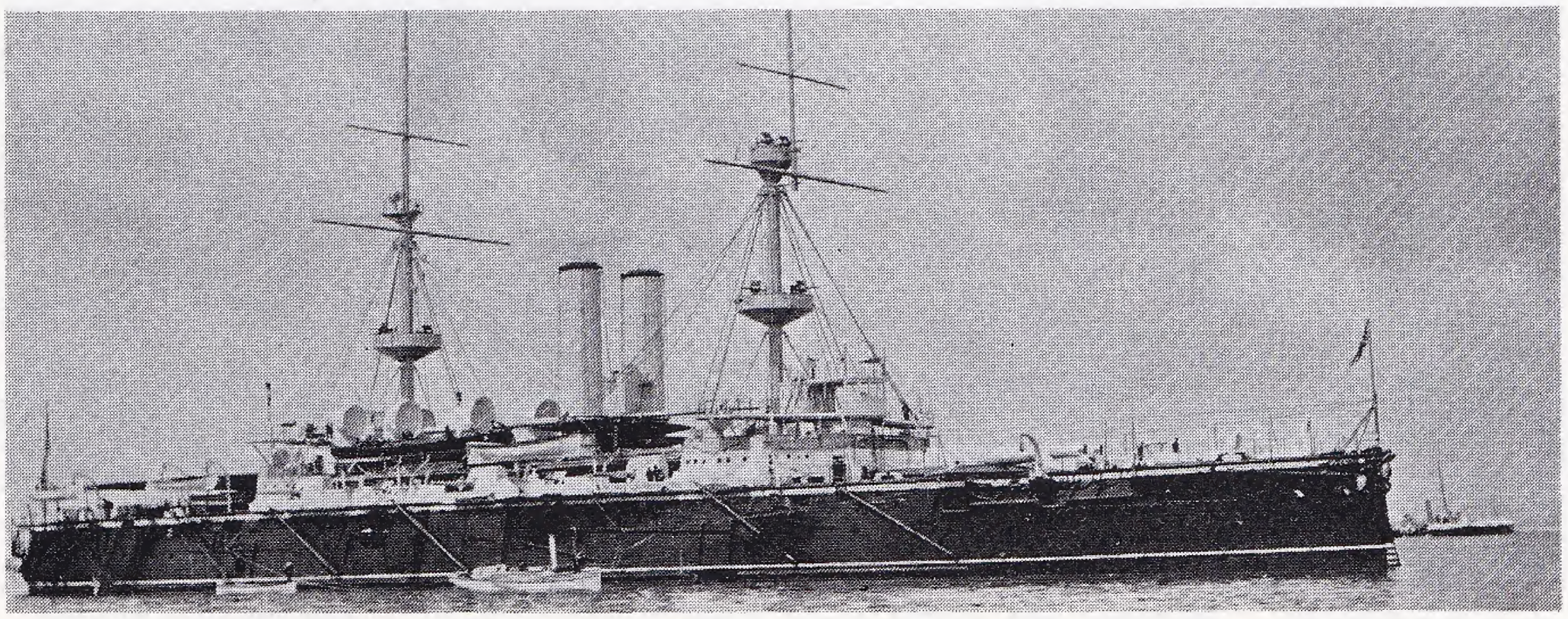




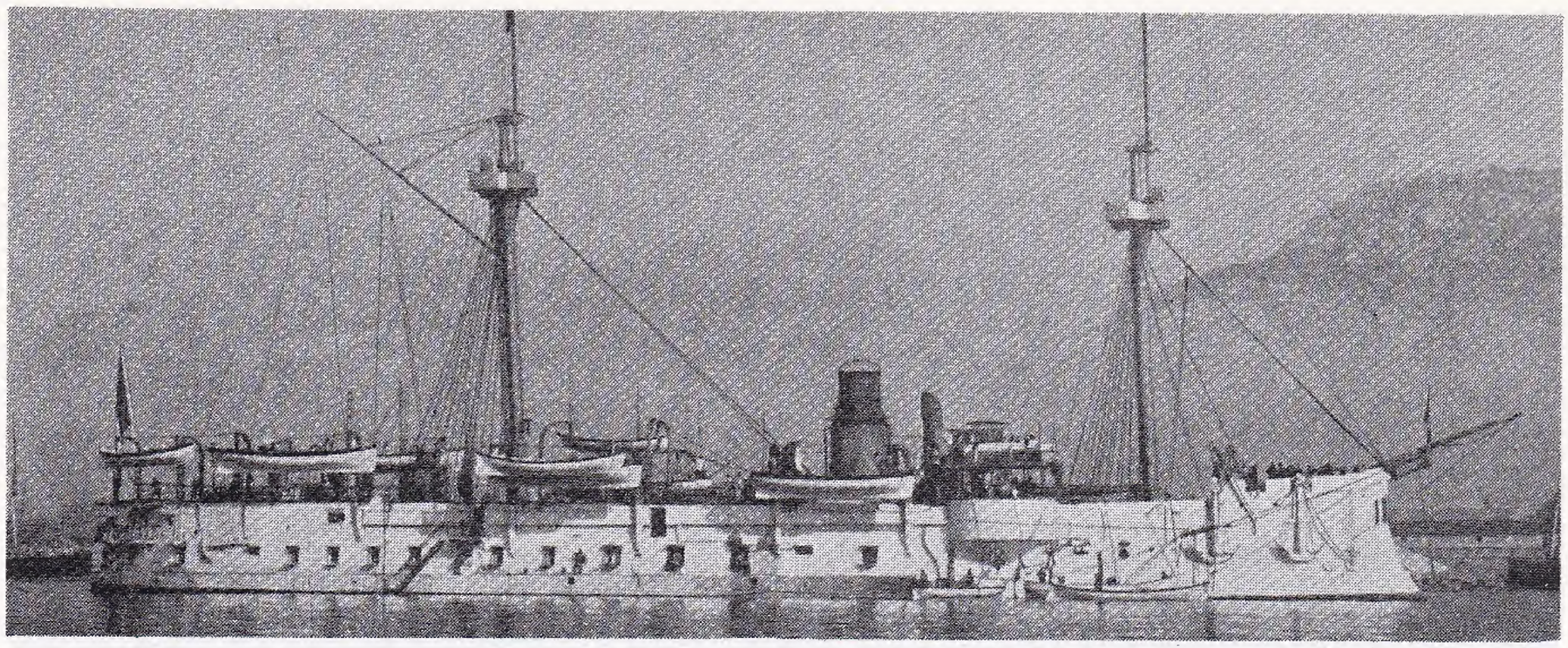
H.M.S. ALEXANDRA – *Laid down 5.3.73. Last broadside ironclad to carry main armament below decks. Armamanet in 1877 2 11" R.M.L., 10 10" R.M.L. and smaller pieces. Fastest battleship of her day. Here seen rearmed with 9.2" B.L., 10" R.M.L. and 4" B.L.*



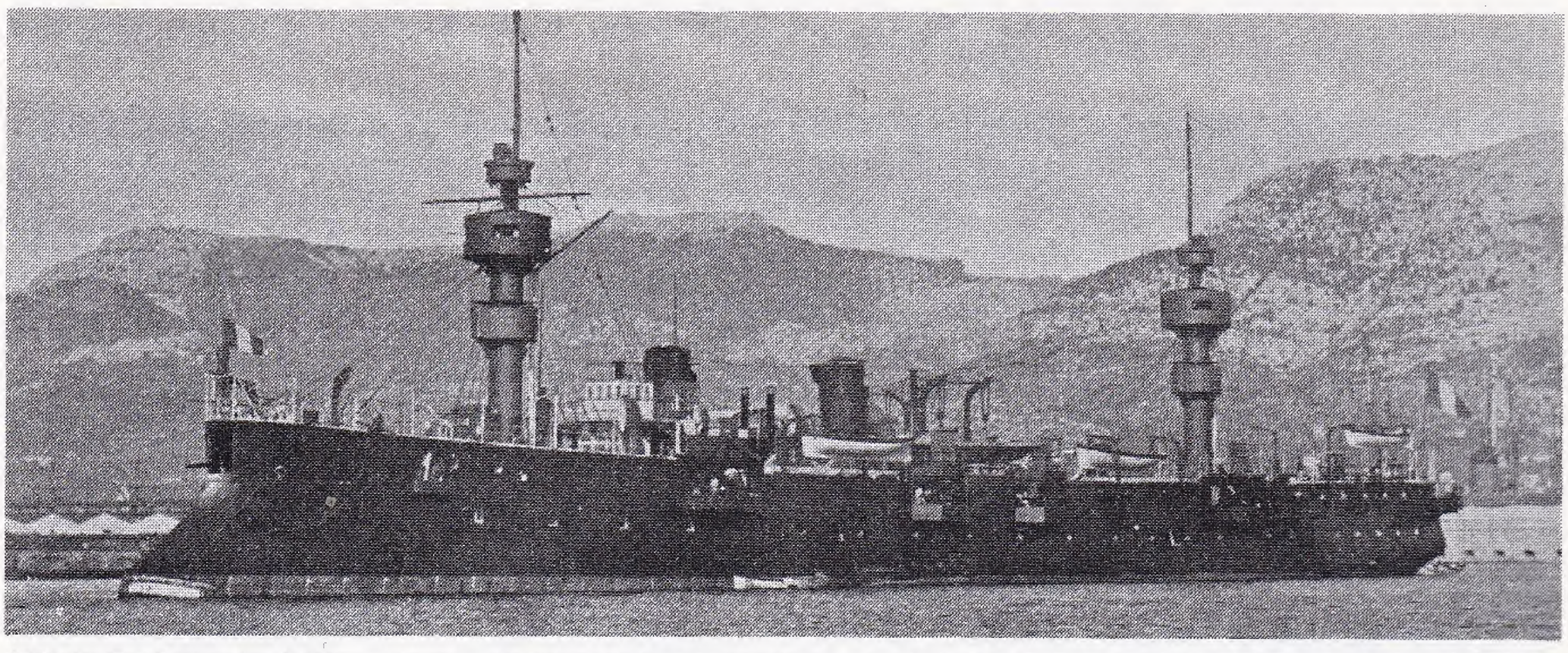
H.M.S. INFLEXIBLE – *Laid down 24.2.74. Thicker armour than any ship before or since (even Bismarcks). A milestone in British Naval Architecture. 4 16" R.M.L. guns. First with compound armour and built at Portsmouth.*



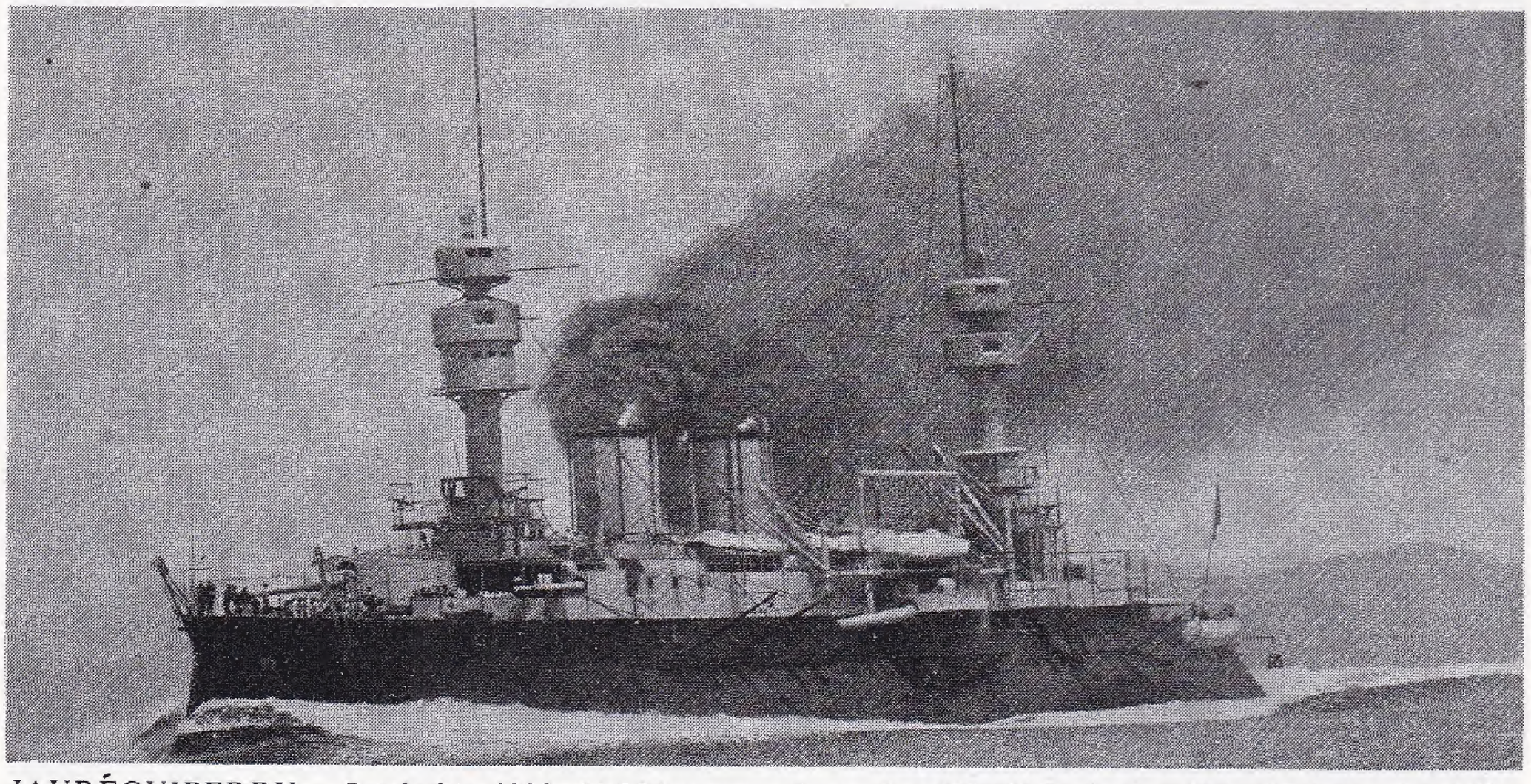
H.M.S. EMPRESS OF INDIA – Laid down 9.7.1889. First with steel armour. 4 13.5" B.L. guns. Completed 1893 under the Naval Defence Act programme.



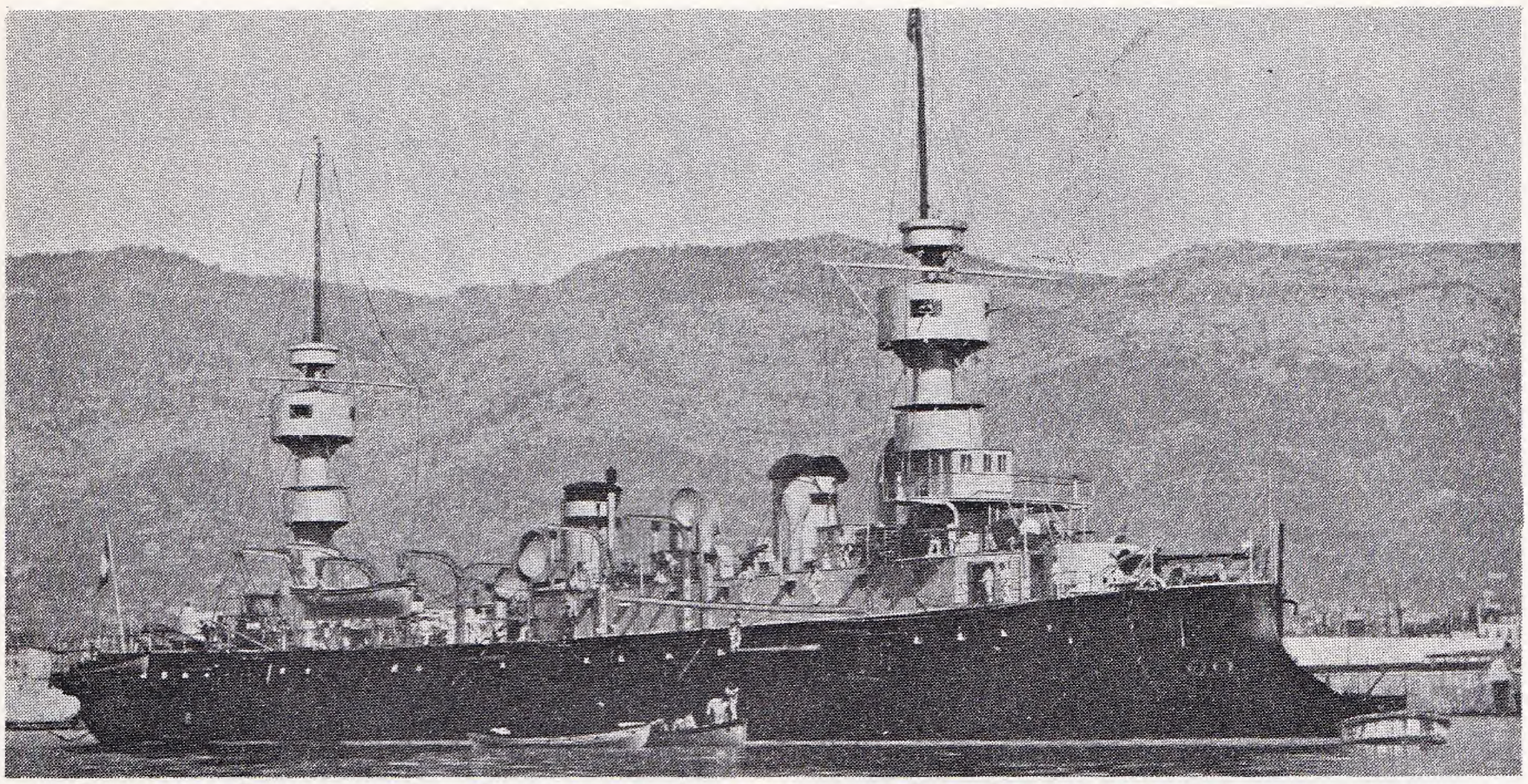
VAUBAN – *Armoured Cruiser 1882 (Cherbourg). 6150 tonnes. Guns: 4 x 9.4" (24.0cm), 1 x 7.4" (18.8cm), 6 x 5.5" (13.8cm). Draught: 24' (4 fathoms), (7.31m).*



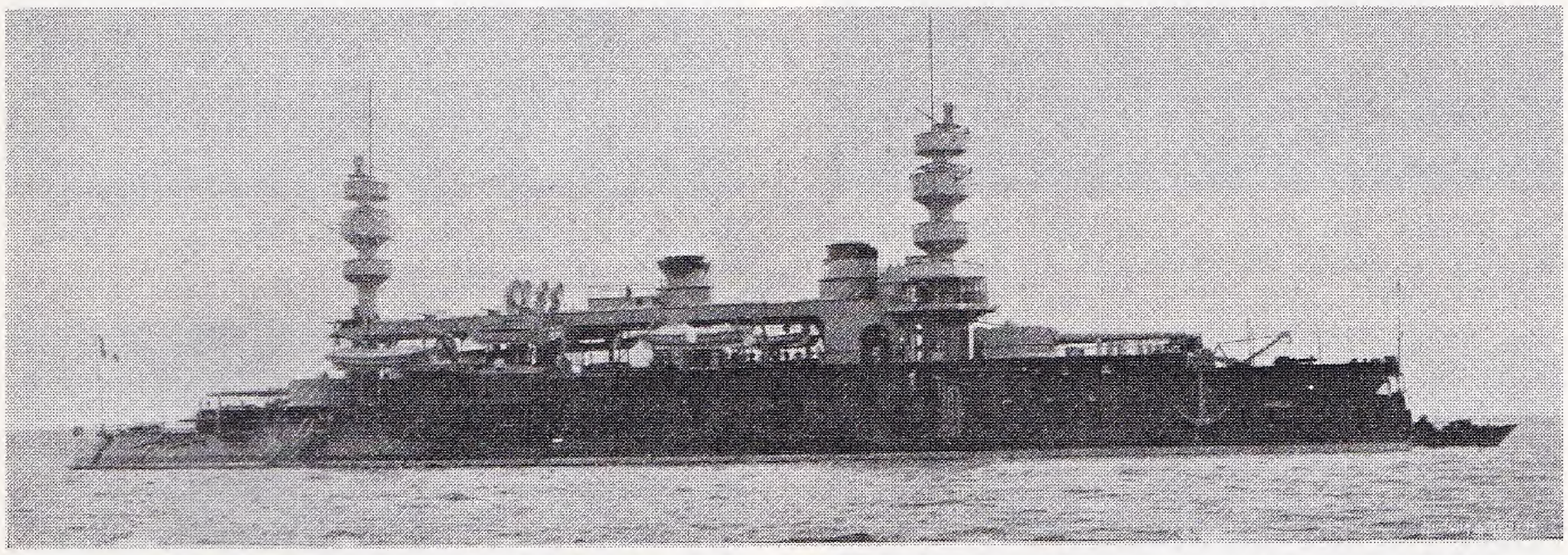
JEAN BART – *2nd Class Cruiser 1889. 4160 tonnes. Guns: 4 x 6.4" (16.4cm), 6 x 5.5" (13.8cm). Draught 22' 6" (3.75F), (6.85m).*



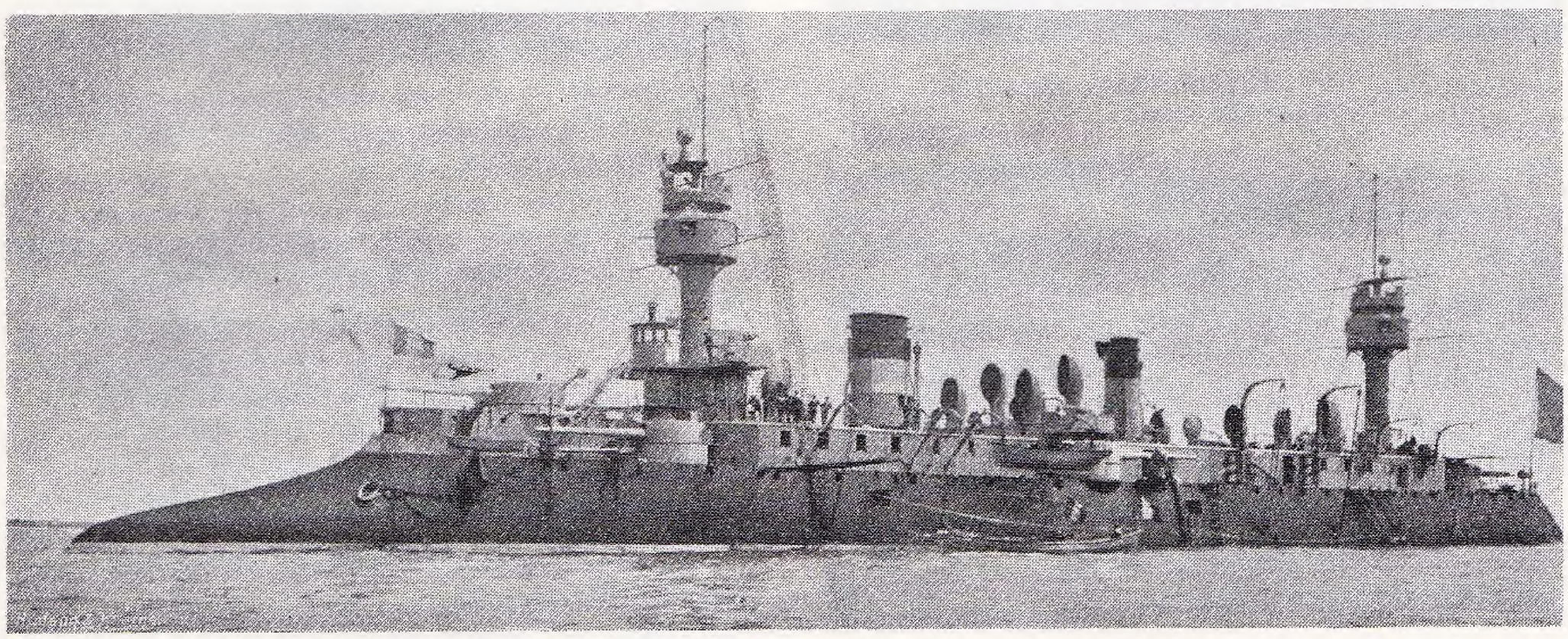
JAURÉGUIBERRY – *Battleship 1893. 11,824 tonnes. Guns: 2 x 12" (30.5cm), 2 x 10.6 (26.9cm), 8 x 5.5" (13.8cm). Armour-belt 17¾" (45.0cm), turrets 14½" (36.8cm), deck 2¾" (6.9cm). 17.5 knots. Draught 27' 9" (4.62F), (8.45m).*



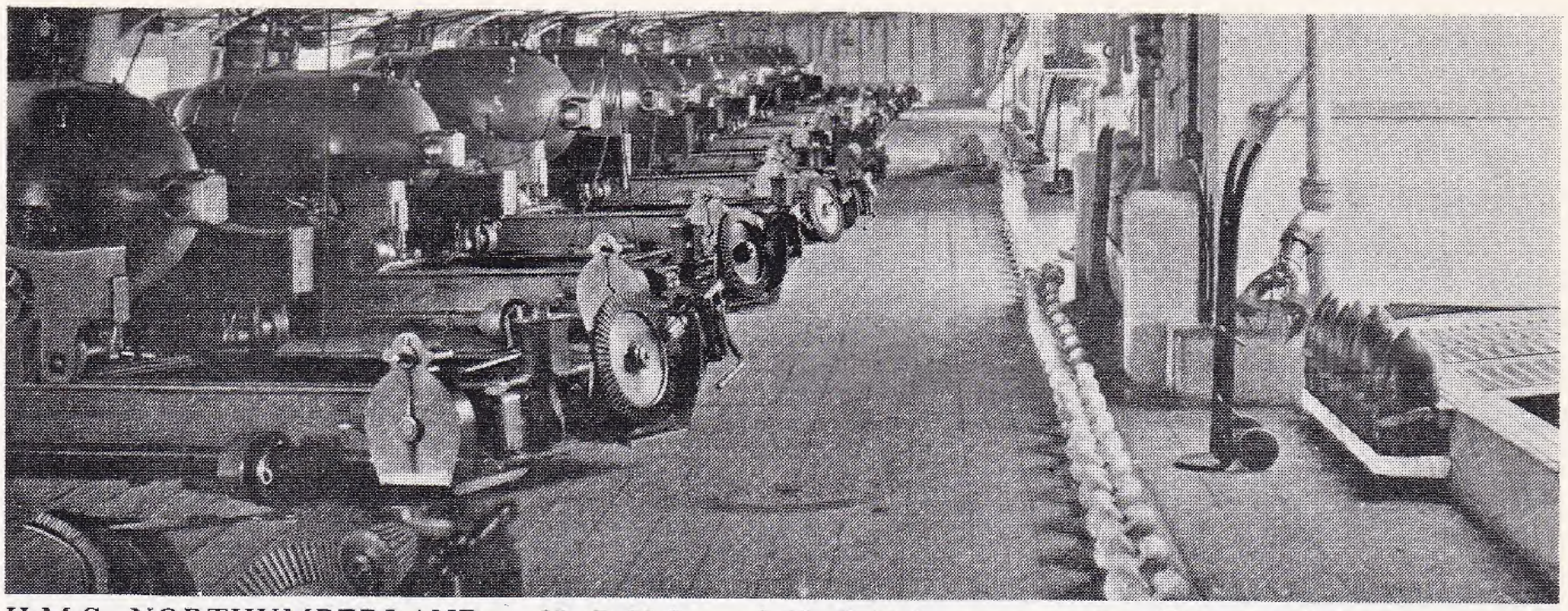
AMIRAL CHARNER – *Armoured Cruiser 1893. 4,750 tonnes displacement. Guns: 2 x 7.4" (18.8cm), 2 x 5.5" (13.8cm). 18.25 knots. Draught 19' 2" (3.19F), (5.84m). Using capped armour piercing shot main guns would penetrate 14½ of krupps armour at 3,000 yards (2,743m). Rate of fire one round per minute.*



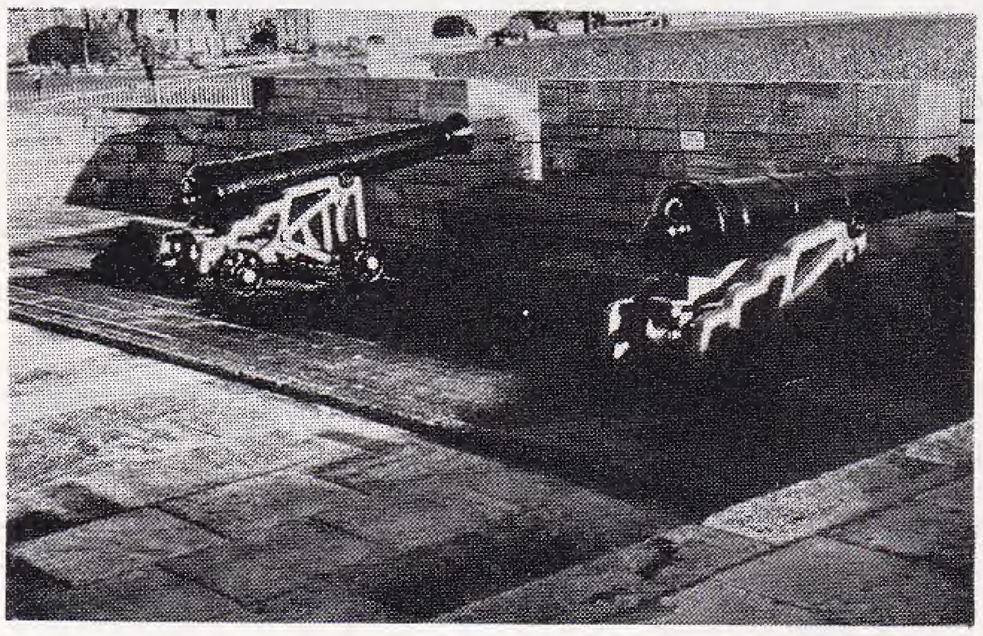
CHARLES MARTEL – *Battleship 1893. 4,880 tonnes. Guns: 2 x 10.6" (26.9cm), 8 x 5.5" (13.8cm). 17.5 knots. Draught 27' 6" (4.58F), (8.38m). Radius of action at 17.5 knots, 1,200 miles. A knot is 6,080' or 1,853m per hour.*



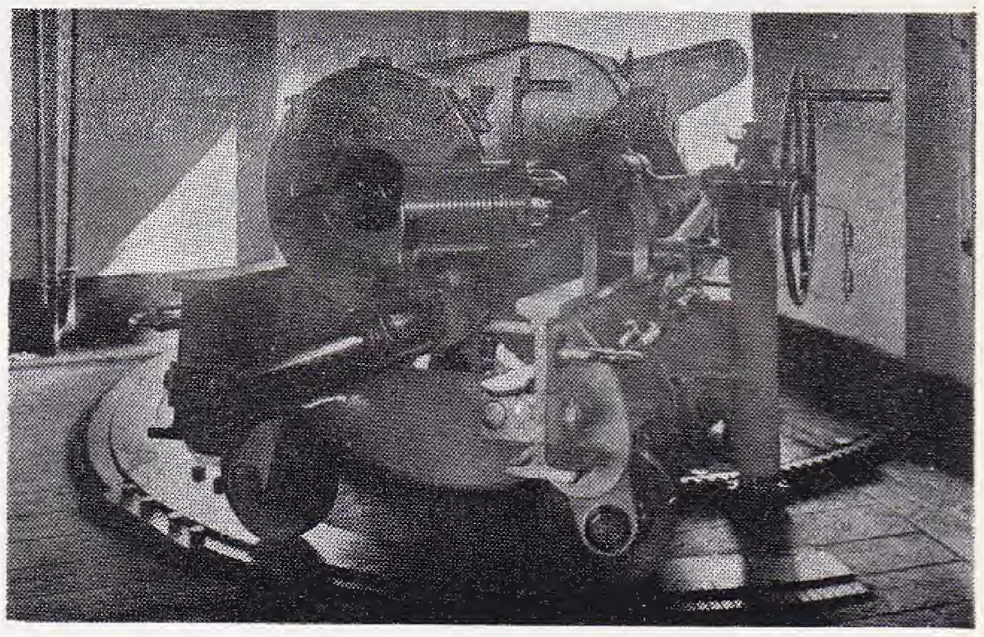
DUPUY DE LÔME – *Armoured Cruiser 1890. 6,297 tonnes. Guns: 2 x 7.4" (18.8cm), 6 x 6.2" (15.7cm). 20 knots. Draught 23' 6" (3.91F), (7.16m). 160 rounds per 7.4" and 200 per 6.2" gun carried.*



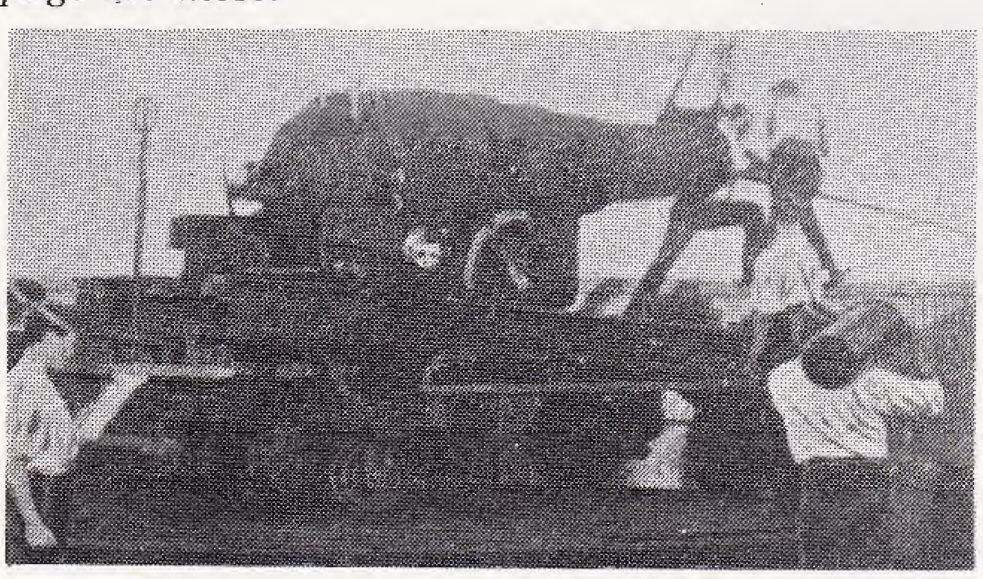
H.M.S. NORTHUMBERLAND – *8" R.M.L. and 9" R.M.L. guns – after 1875. Shell burst would be uncontained.*



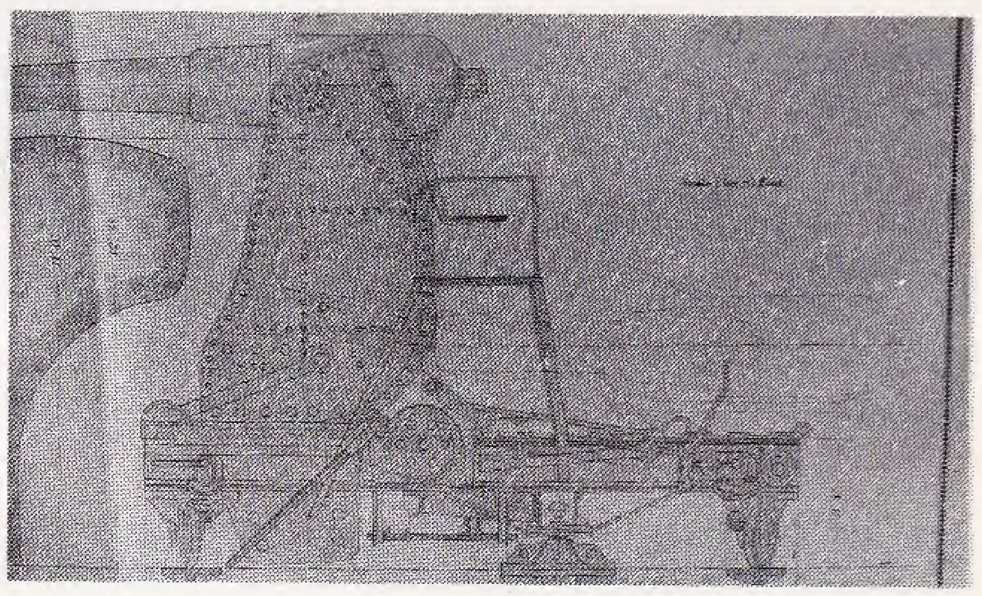
Coastal gun smooth bore 32 pounder on Garrison standing carriages. The earliest of the guns on this page are these.



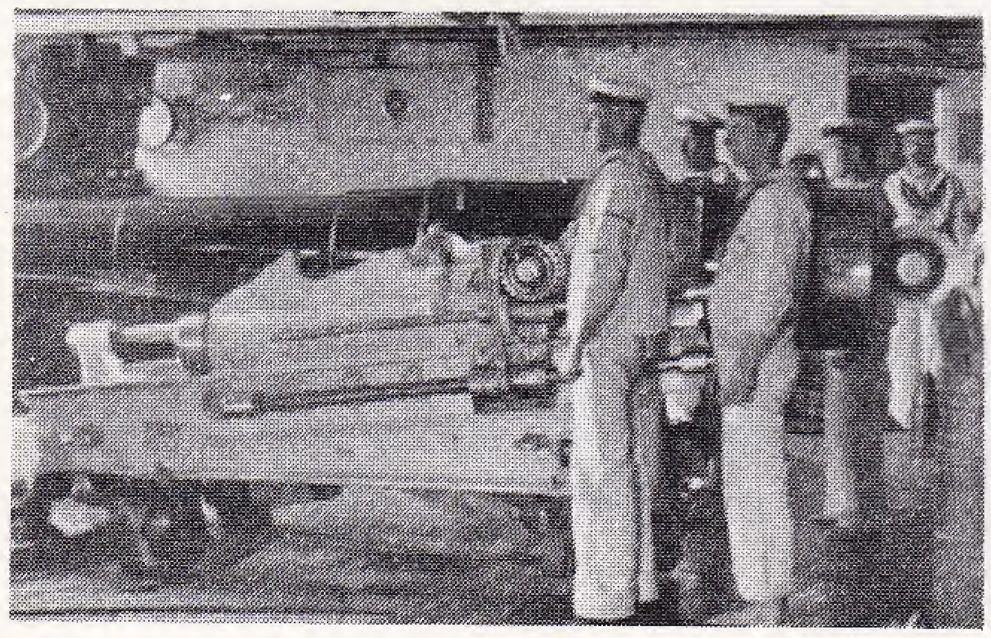
French 5.4 C.M. (2.1") of 1884. Note how casemate walls would contain blast.



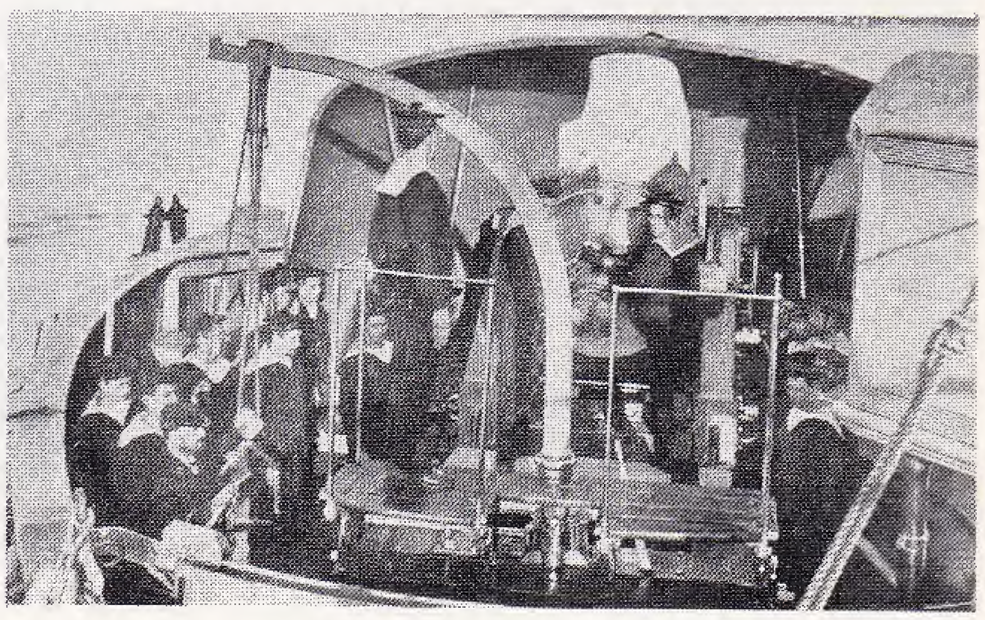
Coastal gun. 10" R.M.L. "En Barbette". Note vulnerability of Rammer.



Coastal gun. 7" R.M.L. on disappearing mounting intended for sea front inner and land front outer lines.



6" B.L. secondary armament of H.M.S. Rodney. Laid down 1882.



A French gun showing the shell hoist.

ACKNOWLEDGEMENTS

I hope this narrative will have shown how certain defensive works had an importance far beyond the small geographical area that the lines of sight from them covered. I have consulted many books and discussed aspects of the defences with many people and to catalogue all the references would take more space than I am allowed but the following have been consulted and are recommended for a fuller understanding of many of the points touched on in this book: "The Second Armada" Prof. A. Temple-Patterson; "The Descent on England" John Carswell; Many Volumes of the Encyclopedia Britannica and "Armour and its Attack by Artillery" by C. Orde-Brown.

MICHAEL POWELL

The author was born in, and has always lived in the area he writes about. His extensive knowledge of the subject comes not only from study of the area but from involvement as a guide taking many parties of visitors around fortifications which he finds fascinating and which experience shows are also of great interest to others. A founder member of the Fort Cumberland Preservation Society and originator of the Fort Cumberland Guard he believes history becomes interesting when people can relate its problems to their own experience.

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